

KEITH WINSER'S
Garden Manual
FOR
ALL AUSTRALIAN STATES





Salpiglossis



Statice



Ageratum



Escallonia Macrantha



Pyracantha (Evergreen Hawthorn)



Celosia



Amaranthus (Jacob's Coat)



Cineraria



Godetia

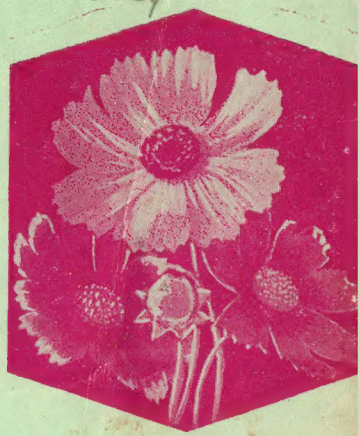
CN12 2.57 -



Tall Blue



Coleus



Calliopsis



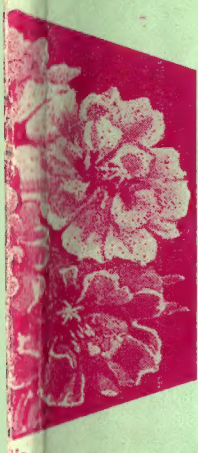
Cockscomb)



Blue Clerodendron Ugandense



Solanum, Wendlandii



Camellia



Balsam Camellia-flowered



Candytuft Umbellata



The family of Protea come from South Africa and their large, semi-translucent heads are defiant of all winter weather, even in the coldest climes. This is the giant Protea cynaroides, which grows nearly a foot across.

Complete Australian **Garden Manual**

Edited by KEITH WINSER

In collaboration with Russell Harding and over 20 Leading Horticultural Authorities.

FIRST PUBLISHED IN 1953



351 Elizabeth St.,

Melbourne, Victoria



STRELITZIA REGINAE

This blue-tongued orange flower appears during the summer and autumn. It requires a warm, well-drained and sheltered position where it can receive ample water during the hot weather but does not have excess moisture in winter. Although this plant may not flower until well established, it is definitely worth waiting for.

OTHER COLOUR PLATES in this Manual: Autumn Foliage, Page 35; *Heleniums*, Page 36; *Abelia*, *Leptospermum*, *Kolkwitzia*, *Prostanthera*, *Viburnum*, *Cotoneaster*, Page 85; *Perennial Asters*, Page 103.

[Illustration by courtesy of Hodgins Nurseries Pty. Ltd., Essendon, Victoria]



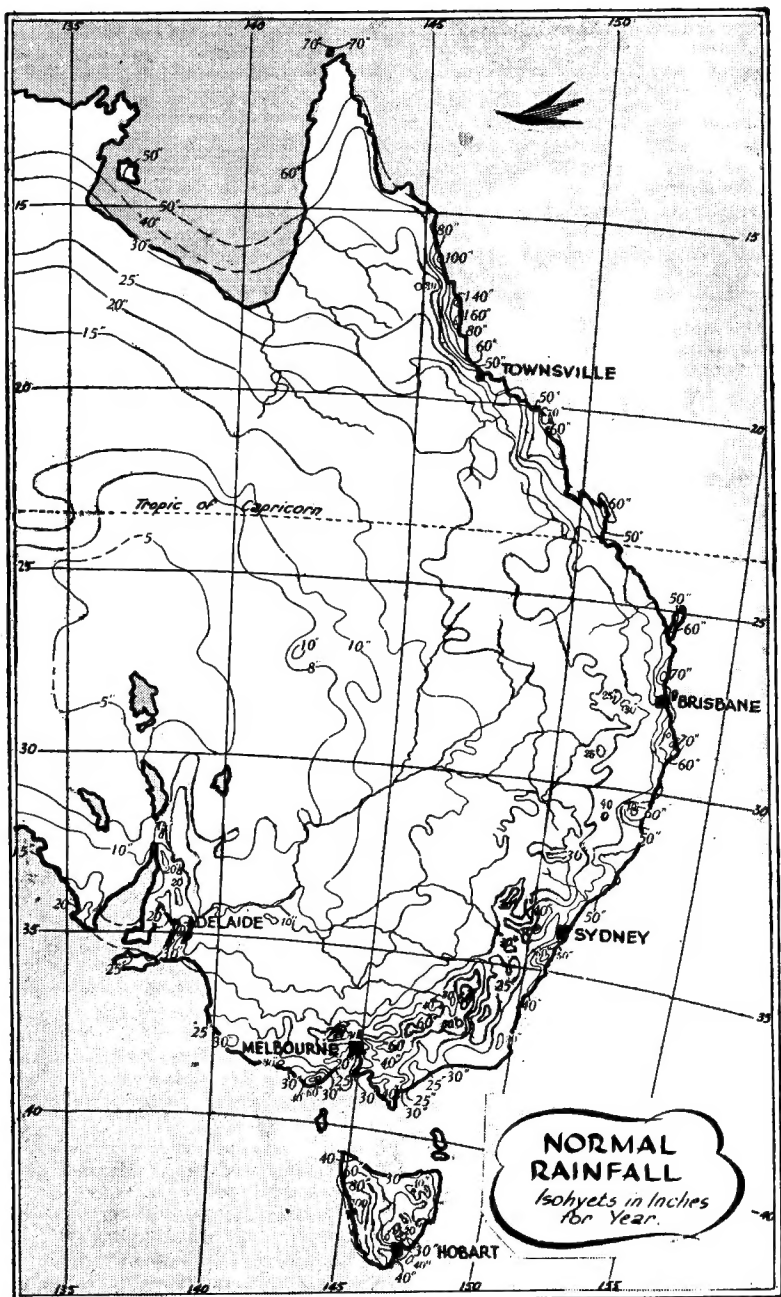
The publishers of this book also present this new, complete Australian Pruning Manual. Price only 7/6.

KEITH WINSER'S GARDEN MANUAL

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Your Introduction . . . to Modern Gardening



★ The gateway to this Malvern home has a spacious flagstone entrance-way, flanked with two shrubs and rockery blooms.

THERE is a never-ending delight in being able to tame Nature and present the best garden in your street. That accomplishment can be your achievement if you follow the rewarding experience of the experts.

Nothing has been spared to condense practical advice into each page of this book. It's not a one-man show, and it doesn't profess to be a glorified seed catalogue. If you want types and varieties, go to a nurseryman who grows for conditions similar to yours and ask for his catalogue and recommendations.

Our book begins where many others leave off, and instead of being a pretty picture book, we, the editors, have aimed at a Garden Maintenance Manual, to be practical and to make it worth your while to consult it frequently.

CONTRIBUTORS AND CO-OPERATORS

We've gone to top authorities to help you. So many are identified with other publications and horticultural departments that they have preferred to remain anonymous, but the most versatile and active editor of this volume has been RUSSELL HARDING, B.Sc., Dip.Ed., ex-lecturer at Agricultural Colleges, etc., who wove the pattern for the inclusion of so many details and personalities. He was the technical editor who left no stone unturned.

Acknowledgments . . .

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The Victorian Department of Agriculture let us have illustrations from Mr. Gayford's pamphlet on pruning. Likewise, thanks are due to the Tasmanian Department of Agriculture for some of the pruning photographs.

Dr. PATTON, Lecturer in Botany at Melbourne University, took a deep interest in the proofs and gave many helpful sessions.

Some of the foremost members of the Royal Horticultural Society proffered personal knowledge and writings. They form the backbone of our contributors. For instance, Dr. HUTTON and Mr. SHAKE-SPEARE, of the Canberra R.H.S., enabled us to reproduce generous sections of their advice on flower-growing, hormones, etc., from their handbook, "The Canberra Gardener."

Mr. T. HONYBUN pruned his prize-winning roses while we made photographs for our artists to copy.

LAWRENCE M. SAUNDERS, F.R.H.S., is our authority on cacti and succulents.

IVO HAMMET is noted for his knowledge of native wildflowers.

C. PLUMRIDGE contributed sections on shrubs, trees and bush-houses.

Rev. RETTICK wrote on Nut Trees.

DAVID MATTHEWS wrote on Roses, Lawns, Rock Pools and Pot Plants.

COLIN SIMPSON contributed Hot-house Plants.

Cr. W. A. COMEADOW, O.B.E., President of the R.H.S., is among our writers. He is also editor of "Your Garden" magazine, for which a number of the abovementioned are regular feature writers.

DEIRDRE WILSON (Dip. Hort.) compiled many of our special localised flowering charts.

The nurserymen have also been of invaluable assistance, particularly Andersons Seeds Ltd., whose climatic zones and recommended varieties we follow. Many illustrations are by their courtesy.

Stinton's, of Geelong, also proved helpful with their catalogue.

The wildflower photographs were taken by Mr. H. T. REEVES.

Numerous illustrations have been drawn by JOHN POWER and JOHN CARR for this work, but I acknowledge some from the "Complete New Zealand Gardener," published by Whitcombe and Tombs Ltd.

The credit for improving your garden will go to you if you break tradition and follow our good advice:—

Dig in compost each season.

Prune as much as you can.

Don't crowd your beds or have more cultivated ground than you can maintain each month.










Landscape your plot — it is so much easier to keep tidy.

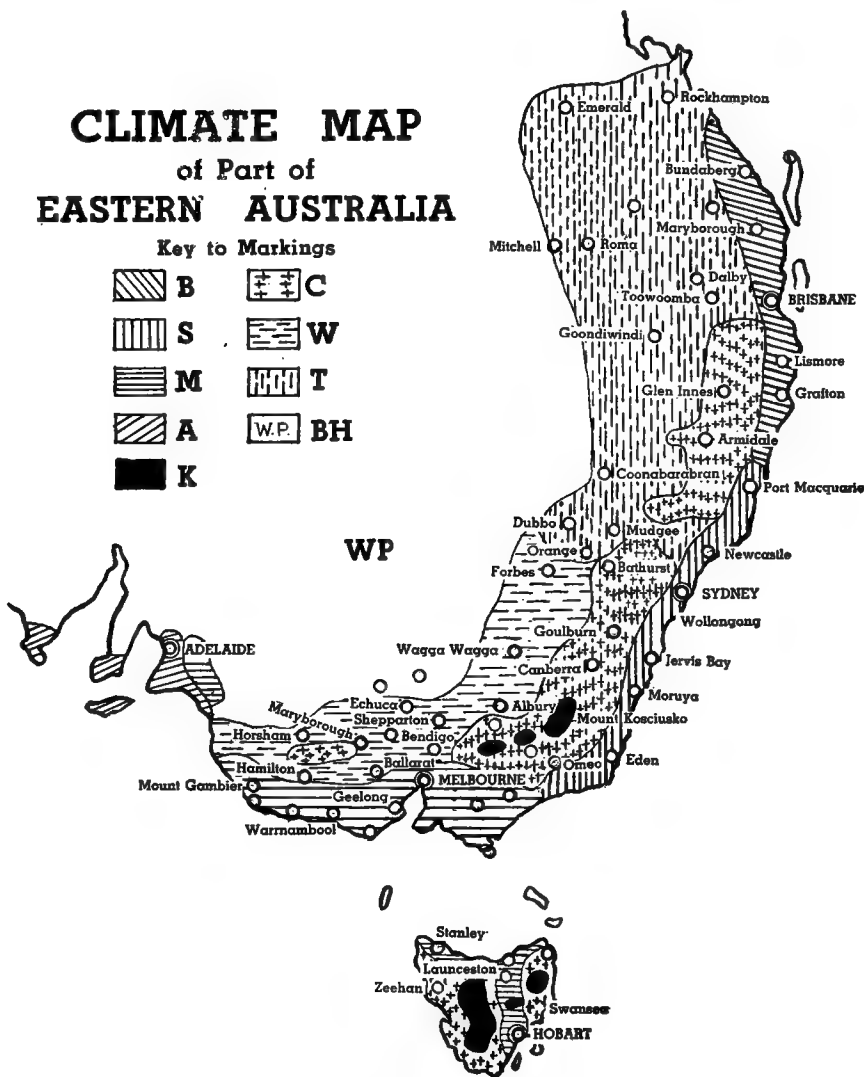
Try to specialise and you'll have a hobby, for only the enthusiastic gardener is a successful one.

— Keith Winser

CLIMATE MAP of Part of EASTERN AUSTRALIA

Key to Markings

 B	 C
 S	 W
 M	 T
 A	 W.P. BH
 K	



Symbols used throughout this book for zones are taken from this map. Key to the letters are on the next page. This map and the recommendations on the following pages are by courtesy of Andersons Seeds Ltd.

Special Note re Western Australia: The South-western Coastal Area from approximately 100 miles north of Perth, and round to Albany, has the climate of Region A.

Plan your Garden

according to your CLIMATE

PLANTS are like people — at their best under conditions which they like most. Things such as the soil and aspect of your garden are important, but you have to start right, with climate on your side.

The map and the following data have been prepared from the gardener's point of view by Andersons Seeds Ltd.

The climatic regions given below apply only to Eastern Australia south of the Tropic of Capricorn (i.e., south of Rockhampton); Adelaide and Perth are also included, but not the remainder of their States.

Symbol

Sub-Tropical Coast or Brisbane Zone	B.
Temperate Coast or Sydney Zone	S.
Cool-temperate Coast or Melbourne Zone	M.
Summer-drought Coast or Adelaide Zone	A.
Tableland or Canberra Zone	C.
Sub-alpine or Kiandra Zone	K.
Northern Slopes or Tamworth Zone	T.
Southern Slopes or Wagga Zone	W.
Western Plains or Broken Hill Zone	BH.

The map gives a general idea of the extent of each region, but it would require a very detailed map indeed to show the exact distribution of each climatic type, since this depends to a great extent on local topography. The climatic region in which any particular locality occurs may be determined by reading the descriptions of the conditions given below, with selections of representative towns, and selecting that which agrees best with one's own locality.

Each climatic region passes more or less gradually into neighbouring ones, and many localities experience somewhat intermediate conditions. Obviously in such cases discretion must be used in selecting plants for cultivation.

There are considerable local variations within each region. These are determined by altitude, exposure, slope, proximity to the sea and, above all, the nature of the soil.

ALTITUDE affects temperature and also rainfall.

EXPOSURE to very hot, cold or dry winds is detrimental, and wind-breaks may be necessary in very exposed places on plains, mountains or sea coast.

SLOPE affects rainfall, depth and stability of soil, and also frost. Frosts are more severe in hollows and in places which are open, but protected from strong winds. Frosts are much less common and less severe under trees than in open country.

PROXIMITY TO THE SEA means greater exposure to winds and to salt spray.

THE NATURE OF THE SOIL is determined partly by climate (temperature, amount and season of rainfall, etc.), and partly by the nature of the rock from which it is derived. On the whole, the soils of dry areas are minerally richer than those of moist areas, but there are some exceptions to this rule, as in the case of rich alluvial or volcanic soils in moist regions.

Description of Regions:

1. Sub-tropical Coast or Brisbane Zone—B.

This extends from north of Bundaberg (Q.) to about Kempsey (N.S.W.) and passes gradually into Zone A, to the south. The annual rainfall varies from below 40 to 70 inches, with a summer maximum, particularly in the north. Droughts occur, but are not of long duration. The humidity is high, so that on the whole the rainfall exceeds the evaporation. The summer is hot and moist and winters are warm, with no frosts near the sea and light frosts further inland. Certain dry areas occur, for example, near Grafton, in which the conditions are a good deal harsher. The region includes the lower parts of the coast ranges, below 2,500 feet.

Representative towns: Q., Maryborough, Brisbane; N.S.W., Lismore, Kyogle, Grafton (drier), Coff's Harbour, Kempsey.

SUITABLE FOR REGION B

Shrubs

Aberia	Euphorbia	Monstera
Acalypha	Feijoa	Montanoa
Abutilon	Fuchsia	Moschosma
Aloysia	Gardenia	Murraya
Ardisia	Goldfussia	Mussaenda
Arduina	Graptophyllum	Nerium
Backhousia	Grevillea	Ochna
Bambusa	Grewia	Phormium
Bauhinia	Habrothamnus	Plectranthus
Browallia	Heliotropium	Plumbago
Brunfelsia	Holmskioldia	Podalyria
Buxus	Inga	Poinciana
Callistemon	Iochroma	Poinsettia
Cantua	Jasminum	Psidium
Cassia	Justicia	Psoralea
Ceratonia	Lagerstroemia	Rondeletia
Cestrum	Lantana	Ruellia
Chorizema	Lasiandra	Russelia
Clerodendron	Leonotus	Senecio
Coprosma	Leptospermum	Sesbania
Crotalaria	Linum	Tamarix
Cuphea	Mackaya	Tecoma
Dracaena	Melaleuca	Thuja
Duranta	Melostoma	Toxicophlaea
Erythrina	Metrosideros	Westringia
Eugenia		
Eupatorium		

Trees

Acacia	Cedrela	Jacaranda
Agonis	Celtis	Lagunaria
Aleurites	Citharexylum	Macadamia
Angophora	Cyphomandra	Melaleuca
Bauhinia	Elaeocarpus	Melia
Brachychiton	Erythrina	Pittosporum
Brassaia	Eugenia	Sapium
Brugmansia	Ficus	Schinus
Callistemon	Flindersia	Stenocarpus
Calodendron	Gardenia	Syncarpia
Cumphora	Grevillea	Tristania
Custanosprium	Harpephyllum	Virgilia
Casuarina	Hymenosprium	

2. Temperate Coast or Sydney Zone—S.

This zone extends from about Kempsey (N.S.W.) southward to East Gippsland (Victoria). The annual rainfall varies from about 30 to 50 inches, falling to 25 inches in a few "dry pockets," and rising to 60 inches in a few favoured spots. It is fairly evenly distributed, tending to a summer maximum in the north and a winter maximum in the south. Around Sydney, autumn is the wettest season. The humidity varies considerably, but, on the whole, evaporation balances rainfall. However, due to the irregularity of rainfall, droughts may be quite severe even at Sydney (rainfall 49 inches). The summers are hot and drier than in Zone B, and winters are cool, frosts being frequent away from the actual seaboard, but by no means as frequent or extending through so much of the year as on the Tablelands. A few areas, such as Windsor-Camden and parts of the Hunter Valley, have almost a western slopes climate, with less rain and more severe temperature extremes than the rest of the coast. On the actual seaboard southerly winds may limit plant growth in exposed places.

Representative towns: N.S.W., Taree, Gloucester, Cessnock (drier), Newcastle, Sydney, Penrith (drier), Springwood, Picton (drier), Wollongong, Moruya, Bega; Vic., Orbost.

The lower slopes (below 2,000 feet) of the Blue Mountains and other ranges fall within this region. There is also a considerable difference of temperature between the northern and southern portions.

SUITABLE FOR REGION S

Shrubs

Aberia	Choisya	Ficus
Abutilon	Chorizema	Forsythia
Acalypha	Cistus	Fuchsia
Aloysia	Clerodendron	Gardenia
Aralia	Coprosma	Genista
Ardisia	Cornus	Goldfussia
Arduina	Cotoneaster	Gordonia
Aronia	Crotalaria	Graptophyllum
Backhousia	Cuphea	Grevillea
Bambusa	Cydonia	Grewia
Bauera	Daedalacanthus	Habrothamnus
Bauhinia	Daphne	Hakea
Benthamia	Deutzia	Heliotropium
Berberis	Diervilla	Hibiscus
Boronia	Diosma	Holmskioldia
Brachysema	Diplacus	Hypericum
Brassaia	Dracaena	Inga
Browallia	Duranta	Iochroma
Brugmansia	Elaeagnis	Jasminum
Brunfelsia	Erica	Justicia
Buxus	Eriostemon	Kerria
Callistemon	Erythrina	Laburnum
Cantua	Escallonia	Lagerstroemia
Caryopteris	Euonymus	Lantana
Cassia	Eupatorium	Lasiandra
Ceratonia	Ecochorda	Laurocerasus
Ceratostigma	Feijoa	Laurus
Cercis	Felicia	Lavandula
Cestrum		

★ For Annuals, Bulbs, etc., see our Monthly Calendar, from Page 14.

DESCRIPTION OF REGIONS

Leonotus	Olea	Rhus
Leptospermum	Osmanthus	Ribes
Linum	Philadelphus	Rondeletia
Luculia	Phormium	Ruellia
Mackaya	Photinia	Russelia
Magnolia	Platanus	Sambucus
Melaleuca	Plumbago	Senecio
Melostoma	Plumiera	Sesbania
Metrosideros	Podalyria	Symphoricar- pus
Monstera	Poinciana	Tamarix
Montanoa	Poinsettia	Tecoma
Moschosma	Polygala	Telopea
Murraya	Prostanthera	Toxicophlæa
Mussaenda	Protea	Ulex
Nandina	Psidium	Veronica
Nerium	Psoralia	Viburnum
Nierembergia	Punica	Westringia
Ochna	Pyracantha	

Trees

Acacia	Ceratopetalum	Macadamia
Acer	Citharexylum	Magnolia
Agonis	Clethra	Melaleuca
Aleurites	Cyphomandra	Milia
Amygdalus	Elaeocarpus	Photinia
Angophora	Erythrina	Pittosporum
Arbutus	Eugenia	Prunus
Bauhinia	Flindersia	Pyrus
Brachychiton	Fraxinus	Quercus
Callistemon	Grevillea	Rhus
Calodendron	Harpephyllum	Sapium
Camphora	Hymenosporum	Schinus
Castanosporum	Idesia	Sophora
Casuarina	Jacaranda	Stenocarpus
Catalpa	Japanica	Syncarpia
Cedrela	Lagunaria	Tristania
Celtis	Liquidambar	Ulmus
Cerasus	Liriodendron	Virgilia
		Vitex

3. Cool-temperate Coast or Melbourne Zone—M.

This includes most of Southern Victoria and South Australia around Mount Gambier, as well as the least elevated parts of Tasmania (below 1,000 feet). The rainfall varies from 25 to over 50 inches and shows a winter maximum, although there is not such a pronounced summer drought as in Adelaide. Although the total rainfall is fairly low in Melbourne and similar places, there are many dull days or days with light rain, so that evaporation and run-off are lessened and a given amount of rainfall is more effective than, say, at Sydney. Summers are fairly hot (Melbourne) to warm (Hobart), and winters are cool to cold. Frosts are common during the winter, except right on the sea coast, and there may be snow in a few places, notably in Tasmania.

Representative towns: Vic., Sale, Melbourne, Geelong, Warrnambool; S.A., Mt. Gambier; Tas., Burnie, Launceston, Hobart (cooler).

SUITABLE FOR REGION M

Shrubs

Aberia	Backhousia	Brachysema
Abutilon	Bambusa	Buxus
Aloysia	Bauera	Callistemon
Aralia	Benthamia	Cantua
Arduina	Berberis	Caryopteris
Aronia	Boronia	Cassia

Ceratostigma	Fuchsia	Olea
Cereis	Gardenia	Osmanthus
Choisya	Genista	Philadelphus
Chorizema	Gordonia	Phormium
Cistus	Grevillea	Photinia
Clethra	Grewia	Plectranthus
Coprosma	Habrothamnus	Plumbago
Cornus	Hakea	Podalyria
Cotoneaster	Heliotropium	Polygala
Crotalaria	Hibiscus	Prostanthera
Cydonia	Hypericum	Protea
Daedala-	Ilex	Psidium
canthus	Inga	Psoralea
Daphne	Jasminum	Punica
Deutzia	Kerria	Pyracantha
Diervilla	Lagerstroemia	Pyrus
Diosma	Lantana	Rhus
Diplacus	Lasianra	Ribes
Dracaena	Laurocerasus	Rondeletia
Duranta	Laurus	Russelia
Elaeagnus	Lavandula	Sambucus
Erica	Leonotus	Sesbania
Eriostemon	Leptospermum	Symphoricar- pus
Erythrina	Linum	Tamarix
Escallonia	Luculia	Tecoma
Eugenia	Magnolia	Ulex
Euonymus	Melaleuca	Veronica
Exochorda	Nandina	Viburnum
Feijoa	Nerium	Westringia
Felicia	Nierembergia	
Forsythia	Ochna	

Trees

Acacia	Ceratonie	Magnolia
Acer	Elaeocarpus	Melaleuca
Agonis	Erythrina	Melia
Aleurites	Ficus	Photinia
Amygdalus	Fraxinus	Pittosporum
Angophora	Gardenia	Platanus
Arbutus	Grevillea	Prunus
Brachychiton	Hymenosporum	Quercus
Brugmansia	Idesia	Rhus
Callistemon	Jacaranda	Sapium
Calodendron	Laburnum	Schinus
Camphora	Lagunaria	Sophora
Casuarina	Leptospermum	Tristania
Catalpa	Liquidambar	Ulmus
Cedrela	Liriodendron	Virgilia
Celtis	Macadamia	Vitex
Cerasus		

4. Summer-drought Coast or Adelaide Zone—A.

This includes the cities of Adelaide and Perth and their immediate neighbourhoods, as well as the tips of Eyre and York Peninsulas, part of Kangaroo Island, and Albany in W.A. The rainfall is from 20 to 30 inches (up to 50 inches in S.W. corner of W.A.), nearly all of which falls during the cooler half of the year. The climate is therefore considerably more severe (except in the 50-inch corner of W.A.) than in other coastal regions, and much watering is desirable during the summer months. The evaporation always exceeds the rainfall. The summers are hot and dry and the winters cool, with moderate frosts away from the seaboard. The Mt. Lofty Ranges are somewhat cooler and moister than the Adelaide Plains, as can be seen by comparing the natural vegetation of the two areas.

DESCRIPTION OF REGIONS

Representative towns: S.A., Adelaide, Port Lincoln; W.A., Albany, Perth. (N.B.—Apart from the S.W. corner, W.A. is not covered by this classification.)

SUITABLE FOR REGION A

Shrubs

Alberia	Dracaena	Melaleuca
Abutilon	Duranta	Montanoa
Aloysia	Elaeagnus	Moschosma
Aralia	Eristemon	Nandina
Arduina	Erythrina	Nerium
Aronia	Escallonia	Nierembergia
Backhousia	Euonymus	Ochna
Bambusa	Exochorda	Olea
Bauera	Feijoa	Osmanthus
Benthamia	Felecia	Philadelphus
Berberis	Forsythia	Phormium
Boronia	Fuchsia	Plectranthus
Brachysema	Gardenia	Plumbago
Buxus	Genista	Podalyria
Callistemon	Gordonia	Polygala
Cantua	Grevillea	Prostanthera
Caryopteris	Grewia	Protea
Cassia	Habro-	Psidium
Ceratostigma	thamnus	Psoralea
Cercis	Hakea	Punica
Cestrum	Heliotropium	Pyracantha
Choisya	Hibiscus	Rhus
Chorizema	Hypericum	Ribes
Cistus	Inga	Rondeletia
Cornus	Jasminum	Russelia
Cotoneaster	Kerria	Sesbania
Crotalaria	Lagerstroemia	Sophora
Cuphea	Lantana	Symphoricar-
Cydonia	Lasiandra	pus
Daedala-	Laurocerasus	Tecoma
canthus	Laurus	Toxicophlaea
Daphne	Leonotus	Ulex
Deutzia	Leptospermum	Veronica
Diervilla	Linum	Viburnum
Diosma	Magnolia	Westringia
Diplacus		

Trees

Acacia	Ceratonia	Magnolia
Acer	Clethra	Melaleuca
Agonis	Elaeocarpus	Melia
Aleurites	Erythrina	Photinia
Amygdalus	Eugenia	Pittosporum
Angophora	Ficus	Platanus
Arbutus	Fraxinus	Prunus
Brachychiton	Grevillea	Pyrus Malus
Brugmansia	Hymen-	Rhus
Callistemon	ospermum	Sapium
Calodendron	Idesia	Schinus
Camphora	Jacaranda	Stenocarpus
Casuarina	Japonica	Tristania
Catalpa	Lagunaria	Ulmus
Cedrela	Liquidambar	Virgilia
Celtis	Macadamia	Vitex
Cerasus		

5. Tablelands or Canberra Zone—C.

This extends from Warwick and Killarney in Southern Queensland south to the highlands of Victoria and Tasmania, but is broken in the Upper Hunter Valley in N.S.W. and north of Melbourne in Victoria, where coastal and slopes climates meet. The tops of various ranges extending both inland and seaward from the Great Divide also fall

within this region, as well as the Grampians of Western Victoria. The boundary between the Tablelands and the lower areas may be taken as 2,500 feet in the north, sloping down to about 1,000 feet or less in Tasmania. The annual rainfall ranges from 30 to 60 inches, falling to below 25 inches (Goulburn-Canberra, and parts of Victoria), or even 19 inches (Cooma) in places, and rising to 70 inches (Dorrigo) in others. The distribution of rainfall throughout the year is fairly even, but tends to a summer maximum in the north and a winter maximum in the south. Mists are frequent in many parts and supplement the rain. Evaporation is less than in the coastal regions, except where the land is exposed to the dry westerly winds. Shelter from cold and dry winds is very important in this region, just as sea-wind shelter is on the seaboard. The summers are cool to warm, with occasional quite hot days, and the winters are cold. Severe frosts occur in winter, and occasionally in summer in the higher parts, and snow is fairly common in winter (rarer, however, at lower and drier places like Bathurst and Goulburn). The snow does not usually lie long, however, as it does in the sub-alpine region.

Representative towns: Q., Stanthorpe, Wallangarra; N.S.W., Glen Innis, Guyra, Armitage, Dorrigo (wetter and milder, almost coastal except for frosts in open places), Walcha, Katoomba, Lithgow, Orange, Moss Vale, Robertson (wetter, similar to Dorrigo and Comboyne, but cooler), Goulburn, Yass, Canberra, Cooma (last four drier), Tumbarumba; Vic., Omeo, Dargo; Tas., Queenstown, Ouse.

SUITABLE FOR REGION C

Shrubs

Aralia	Diosma	Nierembergia
Aronia	Erica	Olea
Benthamia	Escallonia	Osmanthus
Berberis	Euonymus	Philadelphus
Boronia	Exochorda	Phormium
Buxus	Forsythia	Photinia
Cantua	Fuchsia	Prostanthera
Caryopteris	Genista	Punica
Ceratostigma	Hibiscus	Pyracantha
Cercis	Hypericum	Rhus
Choisya	Ilex	Ribes
Cistus	Kerria	Sambucus
Cornus	Laurocerasus	Symphoricar-
Cotoneaster	Laurus	pus
Cydonia	Lavandula	Telopea
Daphne	Leptospermum	Ulex
Deutzia	Nandina	Veronica
Diervilla	Nerium	Viburnum

Trees

Acacia	Elaeagnus	Platanus
Acer	Eugenia	Prunus
Amygdalus	Fraxinus	Pyrus
Arbutus	Idesia	Quercus
Catalpa	Loburnum	Rhus
Celtis	Liquidambar	Sophora
Cerasus	Li-odendron	Ulmus
Ceratonia	Pittosporum	Vitex
Clethra		

DESCRIPTION OF REGIONS

6. Sub-alpine or Kiandra Zone —K.

This includes only the highest parts of the Tablelands, comprising the Australian Alps in Southern N.S.W. and Victoria (above 3,500-4,000 feet) and the mountain regions of Tasmania (above 2,800 feet). It has a very severe climate, in which low temperature rather than lack of moisture limits plant growth. The rainfall varies from 40 to 60 inches, and blizzards and heavy snow-falls occur in winter. Some snow remains on the higher parts throughout the year. The summer is cool, but warm days are frequent. Frosts occur throughout the year and snow in December is not unknown; freezing winds sweep across the highlands throughout the winter months. During the summer there is a wealth of native dwarf alpine plants in the hilltops, which provide a grand floral display, but trees can grow only in sheltered hollows.

Representative localities: N.S.W., Kiandra, Mt. Kosciusko; Vic., Mt. Buffalo, Mt. Hotham; Tas., Lake St. Clair, Cradle Mountain.

SUITABLE FOR REGION K

Shrubs

Aralia	Elaeagnus	Nandina
Aronia	Erica	Nierembergia
Benthamia	Escallonia	Phormium
Berberis	Euonymus	Osmanthus
Buxus	Exochorda	Philadelphus
Caryopteris	Forsythia	Photinia
Ceratostigma	Fuchsia	Punica
Cercia	Genista	Pyracantha
Choisya	Hibiscus	Rhus
Cistus	Hypericum	Ribes
Cornus	Ilex	Sambucus
Cotoneaster	Kerria	Symphoricarpos
Cydonia	Laburnum	Ulex
Daphne	Laurocerasus	Veronica
Deutzia	Laurus	Viburnum
Diervilla	Lavandula	

Trees

Acer	Fraxinus	Quercus
Amygdalus	Liquidambar	Rhus
Arbutus	Liriodendron	Sophora
Catalpa	Platanus	Ulmus
Cerasus	Prunus	Vitex
Clethra	Pyrus	

are hot and the winters cool, with mild to fairly severe frosts. Duststorms sweep in from the western plains in the summer. This is a fairly rigorous climate, but the soils on the whole are rich, and if water and some shelter are available many plants do well.

Representative towns: Q., Rockhampton (some coastal features), Roma, Toowoomba (cooler and moister); N.S.W., Inverell, Warialda, Moree and Narrabri (actually on the plains but moister than the real west, although subject to severe droughts), Gunndah, Tamworth, Dubbo.

SUITABLE TO REGION T

Shrubs

Aberia	Dracaena	Luculia
Abutilon	Duranta	Magnolia
Aloysia	Elaeagnus	Melaleuca
Aralia	Erica	Meiostoma
Arbutus	Eriostemon	Montanoa
Arduina	Erythrina	Mochosma
Aronia	Escallonia	Nandina
Backhousia	Eugenia	Nerium
Bambusa	Euonymus	Nierembergia
Bauera	Exochorda	Ochna
Benthamia	Feijoa	Olea
Berberis	Felicia	Osmanthus
Boronia	Forsythia	Philadelphus
Brachysema	Fuchsia	Phormium
Brugmansia	Gardenia	Plectranthus
Buxus	Genista	Plumbago
Callistemon	Gordonia	Podalyria
Cantua	Grevillea	Polygala
Caryopteris	Grewia	Prostanthera
Cassia	Habrothamnus	Protea
Ceratonia	Hakea	Prunus
Ceratostigma	Heliotropium	Psidium
Cercia	Hibiscus	Psoralea
Cestrum	Hypericum	Punica
Choisya	Ilex	Pyracantha
Chorizema	Inga	Rondeletia
Cistus	Jasminum	Ruellia
Coprosma	Kerria	Russelia
Cotoneaster	Laburnum	Sambucus
Crotalaria	Lagerstroemia	Symphoricarpos
Cuphea	Lantana	Tamarix
Cydonia	Lasiandra	Tecoma
Daedalacanthus	Laurocerasus	Telopea
Daphne	Laurus	Toxicaphilaea
Deutzia	Lavandula	Ulex
Diervilla	Leonotus	Veronica
Diosma	Leptospermum	Viburnum
Diplacuss	Linum	Westringia

Trees

Acacia	Cerasus	Melaleuca
Acer	Citharexylum	Melia
Agonis	Elaeocarpus	Photinia
Aleurites	Erythrina	Pittosporum
Amygalus	Eugenia	Platanus
Angophora	Ficus	Pyrus
Brachychiton	Flindersia	Quercus
Callistemon	Gardenia	Rhus
Calodendron	Harpephyllum	Sapium
Camphora	Jacaranda	Schinus
Castanospermum	Lagunaria	Stenocarpus
Casuarina	Liquidambar	Tristania
Cedrela	Macadamia	Ulmus
Celtis	Magnolia	Virzilia

7. Northern Slopes or Tamworth Zone—T.

This extends from Rockhampton (near the coast, but a slopes climate) south to about Dubbo, keeping to the west of the Tablelands but extending to the coastal zone in the north and in the Upper Hunter Valley. To the south it passes into the next region, and to the west it merges into the western plains. The rainfall varies from 16 to 30 inches, with a summer maximum, except towards the south, where the rain is evenly distributed throughout the year. The evaporation always exceeds the rainfall. Droughts are frequent and fairly severe. The summers



DOUBLE CAMELLIA



ERIOSTEMON NERIFOLIUM

DESCRIPTION OF REGIONS

8. Southern Slopes or Wagga Zone—W.

These extend southward from about Dubbo to Northern Victoria, and merge into the coastal zone in Western Victoria. The eastern slopes of the Mt. Lofty Ranges in S.A. have a somewhat similar climate, as have a few drier spots in the Midlands of Tasmania. As already mentioned, the Windsor-Camden area in N.S.W. has almost a western climate. The climate is very similar to that of Zone T, but has a winter rainfall maximum, except in the north, where the distribution of rainfall is fairly even. The winter is cooler and frosts are more frequent and of longer duration. The effects of this are well illustrated by the later wheat harvests of the southern slopes. Except in the south, the summer is quite hot.

Representative towns: N.S.W., Parkes, Grenfell, Young, Cootamundra, Wagga, Tumut, Albury; Vic., Wangaratta, Bendigo, Horsham. (Ballarat is on the borderline between this zone and Zone M.) The more inland parts are, of course, drier and more subject to duststorms.

SUITABLE FOR REGION W

Shrubs

Aberia	Bambusa	Callistemon
Abutilon	Bauera	Cantua
Aloysia	Benthamia	Caryopteris
Aleurites	Berberis	Cassia
Aralia	Boronia	Ceratostigma
Arduina	Brachysema	Cercis
Aronia	Brugmansia	Cestrum
Backhousia	Buxus	Choisya

Chorizema	Gardenia	Olea
Cistus	Genista	Osmanthus
Coprosma	Gordonia	Philadelphus
Cornus	Grevillea	Phormium
Cotoneaster	Grewia	Plectranthus
Crotalaria	Habro-	Plumbago
Cuphea	thamnus	Podalyria
Cydonia	Hakea	Polygala
Daedala-	Heliotropium	Prostanthera
canthus	Hibiscus	Protea
Daphne	Hypericum	Psidium
Deutzia	Ilex	Psoralea
Diervilla	Inga	Punica
Diosma	Jasminum	Pyracantha
Diplacus	Kerria	Ribes
Dracaena	Lagerstroemia	Rondeletia
Duranta	Lantana	Russelia
Elaeagnus	Laurocerasus	Sambucus
Erica	Laurus	Symphoricar-
Eriostemon	Lavandula	pus
Erythrina	Leonotis	Tecoma
Escallonia	Leptospermum	Teloepa
Euonymus	Linum	Tamarix
Exochorda	Magnolia	Toxicophlaea
Feljoa	Melaleuca	Ulex
Felicia	Nandina	Veronica
Ficus	Nerium	Viburnum
Forsythia	Nierembergia	Westringia
Fuchsia	Ochna	

Trees

Acacia	Camphora	Elaeocarpus
Acer	Casuarina	Erythrina
Agonis	Catalpa	Eugenia
Amygdalus	Cedrela	Fraxinus
Angophora	Celtis	Grevillea
Arbutus	Cerasus	Hymen-
Callistemon	Ceratonja	sporum
Calodendron	Clethra	Idesia



MELALEUCA PULCHELLA — "Clawflower"

DESCRIPTION OF REGIONS

Jacaranda	Melia	Sapium
Laburnum	Photinia	Schinus
Lagunaria	Pittosporum	Sophora
Liquidambar	Platanus	Stenocarpus
Liriodendron	Prunus	Tristania
Macadamia	Pyrus	Ulmus
Magnolia	Quercus	Virgilia
Melaleuca	Rhus	Vitex

but this is of little importance to the gardener, who must in any case depend on water from rivers, bores or wells to grow anything but a few very drought-hardy shrubs and trees.

The summers are very hot and the winters cool, with light to medium frosts. Dew is important in the winter, at least to the native plants. Droughts of long duration (years) are frequent, but in some years the rainfall is quite good, and the appearance of the countryside varies enormously from year to year. Wind erosion is serious and duststorms are common in summer. Soils in most parts are highly fertile, when not eroded, and if plenty of water is available, as, for example, in settlements along the Murray and Darling Rivers plant growth is quite luxuriant, although shade in summer

9. Western Plains or Broken Hill Zone—BH.

This vast region includes the whole area inland from the slopes, with a rainfall below 16 inches. The rainfall varies from below 6 to 16 inches and is very irregular. There is a tendency to a summer maximum in the north and a winter maximum in the south,

DESCRIPTION OF REGIONS

is essential for all but the hardest species. The furthest inland regions (e.g., White Cliffs, Tibbooburra, Oodnadatta) are extremely dry and possess a true desert climate in which practically nothing will grow unless water is available. However, Broken Hill (9 inches) now has fine plantations of hardy native trees and shrubs which grow quite satisfactorily if water is available while they are young; and the fertility of the Mildura and Renmark irrigated lands is well known.

Representative towns: Q., Charleville, Cunnamulla; N.S.W., Collarembri, Bourke, Cobar, Wilcannia, Broken Hill, Hillston, Hay; Vic., Mildura; S.A., Renmark, Port Augusta, Whyalla; W.A., Kalgoorlie.

SUITABLE FOR REGION BH

Shrubs

Aberia	Cydonia	Heliotropium
Abutilon	Daedalia-	Hibiscus
Aloysia	canthus	Hypericum
Alvula	Daphne	Inga
Arduina	Deutzia	Jasminum
Aronia	Diervilla	Kerria
Backhousia	Diosma	Lagerstroemia
Bambusa	Diplacus	Lantana
Bauera	Dracaena	Lasiandra
Herberis	Duranta	Laurocerosus
Boronia	Elaeagnus	Leonotus
Brachysema	Eriostemon	Leptospermum
Brugmansia	Erythrina	Linum
Buxus	Escallonia	Magnolia
Callistemon	Euconymus	Melaleuca
Caryopteris	Feijoa	Nandina
Cassia	Felicia	Nerium
Ceratostigma	Forsythia	Nierembergia
Cercis	Fuchsia	Ochna
Cestrum	Gardenia	Olea
Choisya	Genista	Osmanthus
Chorizema	Gordonia	Philadelphus
Cistus	Grevillea	Phormium
Coprosma	Grewia	Plectranthus
Cotoneaster	Habro-	Plumbago
Crotalaria	thamnus	Podalyria
Cuphea	Hakea	Polygala

Prostanthera	Pyracantha	Toxicophlaea
Protea	Rondeletia	Ulex
Psidium	Russelia	Veronica
Psoralea	Tamarix	Viburnum
Punica	Tecoma	Westringia

Trees

Acacia	Celtis	Melaleuca
Agonis	Ceratonia	Melia
Aleurites	Citharoxylum	Photinia
Amygdalus	Erythrina	Pittosporum
Angophora	Ficus	Prunus
Arbutus	Harpephyllum	Rhus
Brachychiton	Hymeno-	Sapium
Callistemon	sporum	Schinus
Calodendron	Jacaranda	Tristania
Camphora	Lagunaria	Ulmus
Casuarina	Macadamia	Virgilia
Cedrela	Magnolia	

It may be objected that some places are unnaturally separated in the above classification; for instance, it may be said that Orbest (S) has more in common with (M) than with Taree (S), but is grouped with the latter in the lists. This is true, but is simply due to the fact that a line must be drawn somewhere between the regions, and such a line will be more or less arbitrary wherever it is drawn. The classification is intended as a guide, not as a hard-and-fast division of the countryside into self-contained units, and a consideration of the conditions in the individual garden will usually enable one to choose suitable plants.



SINGLE CAMELLIA



PLUMBAGO CAPENSIS
Is Hardy. Blooms in summer.

Garden Calendar

Month by Month

What to do in JANUARY . . .

- ★ Days with hot, dry winds will scorch new seedlings if they are not kept protected and moist. You can plant early flowering sweet peas, bud the roses and fruit trees; if you live in a cool zone, mulch rhododendrons and azaleas with compost or leaves. Lift many of the bulbs. Chrysanthemums should have all suckers removed and main shoots pinched out. Give them a good watering. Water especially the dahlias and plants with roots close to the surface. Manure such vegetables as the pumpkins and marrows. A spoonful of blood and bone to each tomato plant will encourage their growth if they are well watered. Summer pruning of fruit trees is recommended.

Flower Seeds to Sow:

Acroclinium (Everlasting), Ageratum, Alyssum, Anchusa, Anemone, Antirrhinum (Snapdragon), Aquilegia (Columbine), Arctotis, Aster (late varieties), Aubretia, Balsam, Brachycome (Swan River Daisy), Calendula (English Marigold), Calliopsis (Annual), Candytuft, Carnations, Celosia (Flame of Fire), Cineraria, Cosmos, Dianthus, Didiscus (Blue Lace Flower), Dimorptheca, Escholtzia (Californian Poppy), Freesia, Gaillardia, Gerbera, Geum, Gomphrena (Globe Amaranth), Gypsophila, Helianthus (Sunflower), Helychrisum (Straw Flower), Hunnemannia (Mexican Poppy), Iceland Poppies, Ipomopsis, Leptosyne (Yellow Marguerite), Linaria, Lupins, Marigold (French), Matthiola (Night-scented Stock), Mignonette, Mimulus (Monkey Flower), Nasturtium, Nemesia, Pansies, Petunia, Phlox, Primula, Ranunculus, Saponaria, Scabiosa (Pin Cushion), Schizanthus (Poor Man's Orchid), Statice, Stocks, Sweet Peas, Sweet William, Sweet Wivelsfield, Verbena, Viola, Wallflower, Zinnia (Early January).

Bulb Time for:

Amaryllis Belladonna, Cyclamen, Haemanthus, Iris (Bearded), Iris (Regelio Cycus), Lycoris, Nerine, Sternbergia.

Vegetables to Grow:

Beans (Dwarf, French, Climbing, Butter), Beet, Silver Beet, Borecole, Broccoli (Green), Brussels Sprouts, Cabbage, Carrots, Cauliflower, Celery, Cress, Endive, Kohl Rabi, Leek, Lettuce, Mustard, Parsley, Parsnip, Peas, Radish, Spinach, Swedes, Tomato (last sowing in cool districts), Turnips.

Fruit and Orchard Programme:

This is a suitable month for budding. Nursery stocks should be well watered if the season has been dry prior to budding. Older trees, if severely cut back in the winter, will have produced strong young wood in which buds can be readily inserted. During this month the young red scale crawlers will be seeking a place to settle. Use white oil spray.

FEBRUARY'S Plantings . . .

- ★ That which we recommended in January's calendar of doings may well be applied this month, as there is not much climatic variation in Australia. The germination periods are the things to watch; see that your preparations are not nipped by early, unremediated frosts due in a month or two, that is, if you live in one of our cooler zones. From the middle of the month, prune the roses for summer. This differs from winter pruning and is mainly a thinning out of weak wood and suckers. Keep the dahlias and chrysanthemums tied, and remember they get thirsty. Layer the carnations for new stock, and clean up some beds for their use. Spray for mildew on roses. Lift out the early gladioli when the foliage turns yellow. Earth up the celery. Early potatoes can be dug. Don't let the fruit mature or fall, as you'll coax the fruit fly in warmer climates and other wogs elsewhere.
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Flower Seeds to Sow:

Acroclinium (Everlasting), Ageratum, Alyssum, Anchusa, Anemone, Antirrhinum (Snapdragon), Aquilegia (Columbine), Arctotis, Aubretia, Bellis Perennis (Double Daisy), Brachycome (Swan River Daisy), Calendula (English Marigold), Calliopsis, Candytuft, Canterbury Bells, Carnations, Centaurea (Cornflower), Chrysanthemum (Annual), Cineraria, Clarkia, Cynoglossum, Delphinium, Dianthus, Didiscus (Blue Lace Flower), Dimorpotheca, Forget-Me-Not, Foxglove, Freesia, Gaillardia, Geum, Gladioli, Godetia, Grasses (Ornamental), Gypsophila, Helychrisum (Straw Flower), Heliotrope (Cherry Pie), Heuchera, Hollyhock, Hunnemannia (Mexican Poppy), Iceland Poppies, Ipomopsis, Lathyrus (Perennial Pea), Leptosyne (Yellow Marguerite), Linaria, Lobelia, Lupins, Marigold (French), Matthiola (Night-scented Stock), Mignonette, Mimulus (Monkey Flower), Nasturtium, Nemesia, Nemophila, Nierembergia (Cup Flower), Nigella (Love-in-a-Mist), Pansies, Pentstemon, Petunia, Phacelia, Phlox, Platycodon, Polyanthus, Primula, Pyrethrum (Golden Feather), Ranunculus, Rhodanthe, Saponaria, Scabiosa (Pin Cushion), Schizanthus (Poor Man's Orchid), Statice, Stocks, Sweet Peas, Sweet William, Sweet Wivelsfield, Thalictrum (Lavender Shower), Venidium, Verbena, Viola, Virginian Stock, Wallflower.

Bulb Time for:

Anemone, Chionodoxa, Crocus, Cyclamen, Daffodil, Freesia, Galanthus, Haemanthus, Hyacinth, Ixia, Iris (Bearded), Iris (Regelia Cyclus), Lachenalia, Lycoris, Nerine, Sternbergia, Tulip.

Vegetables to Grow:

Sow Seeds of Beans (Dwarf, French, Climbing, Butter), Beet, Silver Beet, Borecole, Broccoli (Green), Brussels Sprouts, Cabbage, Carrots, Cauliflower, Celery, Cress, Endive, Herbs, Kohl Rabi, Leek, Lettuce, Mustard, Onions (early sorts), Parsley, Parsnip, Peas, Radish, Spinach, Swedes, Turnip.
PLANT: Garlic, Potato Onions, Shallot, Tree Onions.

Fruit and Orchard Programme:

Citrus trees will benefit from fertiliser applied this month or early in March. Animal manures may be applied if the soil is moist. Citrus trees may be planted this month, or not later than early in March. If the area is frosty, however, it is better to wait until spring. This is also a good month for budding.

MARCH in the Garden . . .

- ★ Your summer flowering annuals will have "had it" by now, and the soil can take a little manure ready for your winter or spring offerings. Make a round of the garden once a week, removing all dead leaves and flowers, and clear the beds of caterpillars. Disbud dahlias. Don't forget that broad beans make a good winter crop. Your citrus trees are due for manure. It is now getting cool enough in some areas to think of new shrubs. Do you like mushrooms? See our vegetable sections for directions. Let the tomatoes ripen inside and they won't be scorched by one of the hot winds from Central Australia. Have you grown turnips lately? In cooler zones it's safe to propagate bedding plants under glass, and also bulbs for winter flowering. If you want to enjoy the multi-coloured hues of ranunculus, put the bulbs in now.

Flower Seeds to Sow:

Acroclinium (Everlasting), Ageratum, Alyssum, Anchusa, Anemone, Antirrhinum (Snapdragon), Aquilegia (Columbine), Aretotis, Aubretia, Bellis Perennis (Double Daisy), Calendula (English Marigold), Calliopsis, Candytuft, Canterbury Bells, Carnations, Centaurea (Cornflower), Chrysanthemum (Annual), Cineraria, Clarkia, Cynoglossum, Delphinium, Dianthus, Didiscus (Blue Lace Flower), Dimorpotheca (African Golden Daisy), Forget-Me-Not, Foxglove, Freesia, Gaillardia, Geum, Gladioli, Godetia, Grasses (Ornamental), Gypsophila, Helychrisum (Straw Flower), Heliotrope (Cherry Pie), Heuchera, Hollyhock, Hunnemannia (Mexican Poppy), Ipomopsis, Larkspur, Lathyrus (Perennial Pea), Leptosyne (Yellow Marguerite), Linaria, Lobelia, Lupins, Marigold (French), Matthiola (Night-scented Stock), Mignonette, Mimulus (Mon'ey Flower), Nasturtium, Nemesia, Nemophila, Nierembergia (Cup Flower), Nigella (Love-in-a-Mist), Pansies, Pentstemon, Phacelia, Phlox, Platycodon, Polyanthus, Poppies (all varieties), Primula, Pyrethrum (Golden Feather), Ranunculus, Rhodanthe, Saponaria, Scabiosa (Pin Cushion), Schizanthus (Poor Man's Orchid), Statice, Stocks, Sweet Peas, Sweet William, Sweet Wivelsfield, Thalictrum (Lavender Shower), Venidium, Verbena, Viola, Virginian Stock, Wallflower.

Bulb Time for:

Agapanthus, Amaryllis, Anemone, Alstroemeria, Anomatheca, Babiana, Calla, Chionodoxa, Crocus, Cyclamen, Daffodil, Freesia, Galanthus, Haemanthus, Hyacinth, Ixia, Jonquil, Lachenalia, Morphia, Muscari, Nerines, Narcissus, Ornithogalum, Polyanthus, Ranunculus, Scilla, Snowflakes, Sparaxis, Streptanthus, Tritonia, Tulip, Watsonia.

Vegetables to Grow:

Beans (Dwarf, French, Climbing, Butter — last sowing), Broad Beans, Beet, Silver Beet, Broccoli (Green), Cabbage, Cauliflower, Carrots, Cress, Endive, Herbs, Kohl Rabi, Leek, Lettuce, Mustard, Onions, Parsley, Peas, Radish, Spinach, Swedes, Turnips.

PLANT: Potato Onions, Shallot, Tree Onions.

Fruit and Orchard Programme:

Give shallow cultivation to coincide with autumn manuring in the case of citrus. Budding may be continued (particularly citrus) while weather keeps warm.

APRIL—Autumn Activity . . .

- ★ If you want a sunny winter garden, put in some deciduous shrubs which will change the whole outlook of your garden come spring. Evergreens will hide unsightly fences and walls left bare when summer creepers die away. Bulbs will keep you busy, and you will be rewarded with better blooms if you lift and replant spring flowering bulbs like narcissi. Look up our flowering period chart for some of the pretty weather-resisting blooms that will come in winter or spring. If you want to know more about our list below, turn to our copious bulb chapter. This is the month to resow lawns and your last chance to pop in winter-flowering sweet peas. Don't burn all the fallen leaves; they will make a valuable mulching leaf mould for spring. Trees and shrubs for summer shade can be selected. Deciduous shrubs and roses should be planted out. Have you thought about trying an espalier fruit tree? Root pruning of fruit trees can be done before the soil becomes too heavy. Little benefit is gained from planting seeds in the cold zones this month.

Flower Seeds to Sow:

Acroclinium (Everlasting), Ageratum, Alyssum, Anemone, Antirrhinum (Snapdragon), Aquilegia (Columbine), Aubretia, Bellis Perennis (Double Daisy), Calendula (English Marigold), Calliopsis, Candytuft, Canterbury Bells, Carnations, Centaurea (Cornflower), Chrysanthemum (Annual), Clarkia, Cynoglossum, Delphinium, Dianthus, Forget-Me-Not, Foxglove, Freesia, Gaillardia, Geum, Godetia, Grasses (Ornamental), Gypsophila, Helychrisum (Straw Flower), Heliotrope (Cherry Pie), Heuchera, Hollyhock, Hunnemannia (Mexican Poppy), Ipomopsis, Larkspur, Lathrus (Perennial Pea), Leptosyne (Yellow Marguerite), Linaria, Lobelia, Lupins, Marigold (French), Matthiola (Night-scented Stock), Mignonette, Mimulus (Monkey Flower), Nasturtium, Nemesia, Nemophila, Nierembergia (Cup Flower), Nigella (Love-in-a-Mist), Pansies, Pentstemon, Phacelia, Platycodon, Polyanthus, Poppies (all varieties), Primula Malacoides, Pyrethrum (Golden Feather), Ranunculus, Saponaria, Scabiosa (Pin Cushion), Schizanthus (Poor Man's Orchid), Statice, Stocks, Sweet Peas, Sweet William, Sweet Wivelsfield, Venidium, Verbena, Viola, Virginian Stock, Wallflower.

Bulb Time for:

Agapanthus, Alstroemeria, Anemone, Anomatheca, Babiana, Chionodoxa, Crocus, Daffodil, Freesia, Galanthus, Haemanthus, Hyacinth, Ixia, Iris (Dutch), Iris (Spanish), Iris (Regelii Cyclus), Jonquil, Lachenalia, Lilium, Morpoxia, Muscari, Ornithogalum, Ranunculus, Scilla, Snowflakes, Sparaxis, Streptanthus, Tritonia, Tulip, Watsonia.

Vegetables to Grow:

SOW SEEDS OF: Bean (Broad), Beet, Silver Beet, Cabbage (Chinese), Carrots, Cress, Endive, Kohl Rabi, Leek, Lettuce, Mustard, Onions, Parsley, Parsnip, Peas, Radish, Spinach, Turnips.
PLANT: Garlic, Potato Onions, Shallot, Tree Onions.

Fruit and Orchard Programme:

Cultivation will only be necessary where it has been neglected last month. Disease and pest control should be exercised. The season for the red scale pest is advancing and trees not already treated should be given priority.

The Month of MAY . . .

- ★ This is the big month for fulfilling your ambitions for those rare trees and shrubs which stand a better chance of survival now, even in this unpredictable Australian climate. Transplanting from pots to open beds before they get root-bound is a timely reminder. The pruning of deciduous fruits and trees can be commenced as soon as the leaves have fallen. We hope you have a good leaf rake and not a garden rake that will uproot lawns or plants in its process. Divide herbaceous plants and rearrange borders. If you want lily of the valley this year, plant the crowns. Prepare a ditch to accommodate your superfluous compost and garden refuse. Irises and ixias will resist the worst of winter. Liming may be applied to sweeten the soil, which may also be sterilised if you have undue visitations from pests which leave their eggs therein. Fruit tree pruning becomes necessary, and root pruning is advantageous for over-vigorous trees. Don't be over-optimistic with outside seed sowings if you live in the Tablelands.
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Flower Seeds to Sow:

Acroclinium (Everlasting), Ageratum, Alyssum, Antirrhinum (Snapdragon), Bellis Perennis (Double Daisy), Calendula (English Marigold), Calliopsis, Candytuft, Canterbury Bells, Carnations, Centaurea (Cornflower), Chrysanthemum (Annual), Clarkia, Delphinium, Dianthus, Gaillardia, Geum, Godetia, Grasses (Ornamental), Gypsophila, Helychrisum (Straw Flower), Heliotrope (Cherry Pie), Heuchera, Larkspur, Linaria, Leptosyne (Yellow Marguerite), Lobelia, Lupins, Marigold (French), Matthiola (Night-scented Stock), Mignonette, Mimulus (Monkey Flower), Nemesis, Pansies, Pentstemon, Phacelia, Poppies (all varieties), Primula, Ranunculus, Saponaria, Scabiosa (Pin Cushion), Schizanthus (Poor Man's Orchid), Statice, Stock, Sweet Peas, Sweet William, Sweet Wivelsfield, Verbena, Viola, Virginian Stock, Wallflower (Early).

Bulb Time for:

Agapanthus, Alstroemeria, Anemone, Babiana, Chionodoxa, Crocus, Daffodils, Dielytra (Bleeding Heart), Freesias, Galanthus, Galtonia, Hippeastrum, Iris (Dutch and Spanish), Iris (Regelia Cyclus), Ixias, Lachenalia, Lily of the Valley, Liliums, Montbretia, Muscari, Paeonies, Ranunculus, Richardia, Solomon's Seal, Sparaxis, Sprekelia, Tigridia, Tritonia, Tuberosa, Tulip, Vallota.

Vegetables to Grow:

SOW SEEDS OF: Bean (Broad), Beet, Cabbage (early variety), Cress, Endive, Kohl Rabi, Leek (mild districts), Lettuce, Mustard (mild districts), Onions, Parsley, Parsnips, Peas (mild districts), Radish, Spinach, Turnips.

PLANT: Asparagus, Garlic, Herbs, Rhubarb.

Fruit and Orchard Programme:

If the soil is very dry, water the citrus trees. Make sure pomegranates and guavas receive treatment if they have been attacked by the fruit fly pest. Apply spray bait to early ripening citrus (especially thin-skinned varieties), also to evergreen shrubs in which fly is likely to shelter.

JUNE'S Winter Preparations . . .

- ★ With the garden in quiescent mood there is time to remake garden paths, to prepare roses and other plants in pots which can be brought in for forcing. Any shrubs and fruit trees will be transplanted easily, and now is the time to think of planting paeonies. Brush up your pruning procedure by reading our special chapter. That which we recommend for May and July will apply to June, so you can be busy with your spring flowering programme. Take a look round at the nurseries and see what plants are in bloom, so that for next winter you will be able to plant for a winter display of flowers while your neighbour's place may look like a desert isle. Spray the fruit trees before the foliage protects the eggs of insect pests. Any waterlogged sections of your garden can be detected for agricultural pipe drainage. Take up the dahlia tubers. In cool climes you may feel like making a glass-house, and a visit to any of the better parks will show you how spring can be heralded in a hot-house.
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Flower Seeds to Sow:

Ageratum, Alyssum, Antirrhinum (Snapdragon), Bellis Perennis (Double Daisy), Calendula (English Marigold), Calliopsis, Candytuft, Canterbury Bells, Carnations, Centaurea (Cornflower), Chrysanthemum (Annual), Clarkia, Delphinium, Dianthus, Gaillardia, Geum, Godetia, Gypsophila, Heliotrope (Cherry Pie), Heuchera, Larkspur, Linaria, Lobelia, Lupins, Mignonette, Nemesia, Poppies (Shirley), Saponaria, Scabiosa (Pin Cushion), Statice, Sweet Peas, Verbena, Virginian Stock, Wallflower (Early).

Bulb Time for:

Alstroemeria, Achimenes, Crinum, Calla, Dielytra (Bleeding Heart), Galtonia, Gladioli, Gloriosa, Iris (Bearded), Iris (Japanese), Iris (Regelii Cyclus), Lily of the Valley, Lilliums, Montbretia, Pancratium, Paeonies, Richardia, Solomon's Seal, Sprekelia, Tigrida, Tuberoses, Vallota.

Vegetables to Grow:

SOW SEEDS OF: Bean (Broad), Cabbage (early varieties), Cress, Endive, Kohl Rabi (mild districts), Leek (mild districts), Lettuce, Mustard (mild districts), Onions (Brown Spanish), Peas (mild districts), Radish, Tomatoes (first sowing in warm coastal climates), Turnips.

PLANT: Artichokes, Asparagus, Garlic, Herbs, Rhubarb.

Fruit and Orchard Programme:

Turn under the green manure crop or weeds and leave the surface rough in order to discourage weeds. Finish off pruning your early peaches and continue with the later maturing varieties. Manuring and fertilising can be done in conjunction with cultivating. June is a very suitable time to plant deciduous trees. White house and sooty mould are citrus fruit pests to be dealt with, and stone fruit will be troubled by peach leaf curl.

JULY—Midwinter . . .

- ★ Winter will keep you busy with the chores of digging in and digging out last year's annuals, pruning the fruit trees and shrubs. Don't forget native wildflowers will put on a far better show for you next season if you cut them back now; but don't disturb their roots. There is still time to catch up on neglected pruning and spraying, and you can repair fences and landscape the garden afresh for the warmer months, when you will have many other attractions. Cuttings of carnations and chrysanthemums and such have a good chance of survival if planted this month. Have some cloches ready to pop over tender plants to protect them from likely frosts. Cut back the climbers such as clematis, wistaria, jasmine, and bignonias. Our other winter months' recommendations are suitable at this time of the year. A little lime on your soil will sweeten it by correcting the acidity. On wet days you can be busy in the workshop sharpening the tools in readiness for the rapid spring growth. New lawns will have a greater chance of survival. This is a good time to start a hobby of indoor gardening, making pot plant racks or even a fernery whose cool shade you will welcome when summer comes.
-

Flower Seeds to Sow:

Ageratum, Alyssum, Antirrhinum (Snapdragon), Begonia (Tuberous), Bellis Perennis (Double Daisy), Calendula (English Marigold), Calliopsis, Candytuft, Canterbury Bells (Annual), Carnations, Centaurea (Cornflower), Chrysanthemum (Annual), Clarkia, Delphinium, Dianthus, Gaillardia, Geum, Godetia, Gypsophila, Larkspur, Linaria, Lobelia, Lupins, Mignonette, Poppies (Shirley), Saponaria, Scabiosa (Pin Cushion), Statice, Sweet Peas, Verbena, Virginian Stock.

Bulb Time for:

Achimene, Agapanthus, Calla, Chlidanthus, Crinum, Dielytra (Bleeding Heart), Flag Iris, Galtonia, Gloriosa Superba, Hippeastrum, Kniphofia, Lillium, Lily of the Valley, Montbretia, Paeonies, Pancratium, Polygonatum, Richardia, Solomon's Seal, Sprekelia, Tigrida, Tuberose, Tuberose Begonia, Vallota.

Vegetables to Grow:

SOW SEEDS OF: Artichokes, Asparagus, Silver Beet, Cabbage (early varieties), Cress, Endive, Leek, Lettuce, Mustard, Onions, Peas, Radish, Rhubarb, Spring Onion, Tomatoes (in warm coastal districts), Turnips.

PLANT: Artichokes, Asparagus, Garlic, Herbs, Potatoes, Rhubarb.

Fruit and Orchard Programme:

As soon as each section has been cultivated, construct wide, shallow surface drains so that excess water can get away during heavy rain with a minimum loss of soil. Continue pruning work on deciduous trees. Plums and peaches may be grafted this month, by the rind graft method. Apples also may be re-worked, using the cleft or wedge graft, or the rind graft. Planting deciduous trees may be continued.

AUGUST Activity . . .

- ★ This is a busy month in northern districts, when spring comes in September, but on tableland and frost-bitten zones it's still mid-winter and the previous month's doings apply. You can prune roses, repair the lawn, mulch various beds, sow the vegetables and spare plants, using the list hereunder, but cover plants under hessian or frost cloches. Finish off any pruning, chop out any trees that have "had it"—for this is a good time to replace with new shrubs and trees. Try your hand at propagation, and the art of taking cuttings so that you can carry on your favourite strains of carnations, chrysanthemums, etc., with vigorous new plants. You can top-dress your lawn if it does not hold much water. You can plant some of those bulbs that you've long wondered what their blooms look like. Camellias can be pruned.
-

Flower Seeds to Sow:

Acroclinium (Everlasting), Ageratum, Alyssum, Antirrhinum (Snapdragon), Arctotis Asters, Begonia, Boronia (Sweet-scented Brown), Brachycome (Swan River Daisy), Calliopsis, Candytuft, Canna, Canterbury Bells (Annual), Capsicum (Ornamental), Carnations, Chrysanthemum (Perennial), Clanthus (Sturt's Desert Pea), Cuphea, Dahlia, Delphinium, Dianthus, Didiscus (Blue Lace Flower), Dimorpotheca, (African Golden Daisy), Gaillardia, Geum, Gladioli, Gomphrena (Globe Amaranth), Godetia, Gypsophila, Helychrisum (Straw Flower), Hunnemannia (Mexican Poppy), Impatiens, Kochia (Summer Cypress), Lathyrus (Perennial Pea), Marigold (African), Matricaria (Camomile), Mignonette, Nasturtium, Phlox, Pomegranate, Poppies (Shirley), Rhodanthe, Salpiglossis, Saponaria, Scabiosa (Pin Cushion), Sesbania, Statice, Stocks (cold climates only), Thalictrum (Lavender Shower), Torenia, Verbena, Zinnia (in warm districts).

Bulb Time for:

Galtonia, Gladioli, Hippeastrum, Lily of the Valley, Montbretia, Paeonies, Richardia, Sprekelia, Vallota.

Vegetables to Grow:

SOW SEEDS OF: Artichoke, Asparagus, Beans (Dwarf, French, Climbing, Butter), Beet, Silver Beet, Cabbage (early varieties), Cape Gooseberry, Celery, Cress, Cucumber (coastal districts), Endive, Herbs, Kohl Rabi, Leek, Lettuce, Melons (coastal districts), Mustard, Parsley, Parsnip, Peanuts, Peas, Radish, Rhubarb, Salsify (Vegetable Oyster), Spinach, Tomatoes (sow under cover in frames), Turnips.

PLANT: Artichokes, Asparagus, Chokos, Herbs, Potatoes, Rhubarb.

done properly, shallow hoe work will be all that is necessary. Irrigate if necessary.

Fruit and Orchard Programme:

Pruning of deciduous fruit trees should be completed by the end of this month. Apples and pears may be grafted. Trees planted earlier in the winter may be given a light top-dressing of blood and bone or animal manure. Continue pest control spraying.

SEPTEMBER—What to Sow . . .

- ★ The pretty annuals and perennials of our expectations can be put in now. Don't forget Michaelmas daisies and gladioli in your spring show. Some of the more rare chrysanthemums and fascinating items from the catalogues can be experimented upon with the hope of an early spring. Remove the flower stems of the bulbs that have finished blooming. Look out for aphids and other wogs on the roses and trees that have been pruned, as the new shoots are a tender morsel. Top-dress the lawns, keep the hedges clipped, feed the hydrangea, put in your borders for your summer foreground, graft any fruit trees, and make an espalier if you wish to save space and have an artificial formation. Read our chapter now. Make the most of manuring before any final seedlings are put in. Keep the hoe busy among the growing crops, and take out those weeds so that they don't get the nutriment before your shy seedlings. Thin out the seedling crops so that you can get virile specimens that will stand the shock of transplanting.
-

Flower Seeds to Sow:

Acroclium (Everlasting), Ageratum, Alyssum, Amaranthus, Antirrhinum (Snapdragon), Arctotis, Asters, Balsam, Begonia, Boronia (Sweet-scented Brown), Brachycome (Swan River Daisy), Calliopsis (Annual), Candytuft, Canna, Capsicum (Ornamental), Carnations, Celosia, Chrysanthemum (Perennial), Clianthus (Sturt's Desert Pea), Cockscomb, Coleus, Convolvulus (Dwarf Morning Glory), Cosmos, Cuphea, Dahlia, Delphinium, Dianthus, Didiscus (Blue Lace Flower), Dimorpotheca (African Golden Daisy), Escholtzia (Californian Poppy), Gaillardia, Gerbera, Gladioli, Gomphrena (Globe Amaranth), Gypsophila, Helianthus (Sunflower), Helychrisum (Straw Flower), Hunnemannia (Mexican Poppy), Impatiens, Kochia (Summer Cypress), Marigold (African), Matricaria (Camomile), Mesembryanthemum, Mignonette, Nasturtium, Petunia, Phlox, Pomegranate, Portulaca, Rhodanthe, Rudbeckia, Salpiglossis, Salvia, Saponaria, Scabiosa (Pin Cushion), Sesbania, Statice, Thalictrum (Lavender Shower), Tithonia (Mexican Sunflower), Torenia, Ursinia, Verbena, Viscaria, Zinnia.

Bulb Time for:

Achimenes, Agapanthus, Begonia, Caladiums, Calla, Canna, Flag Iris, Gladioli, Kniphofia, Japanese Iris, Tuberose, Tuberose Begonia.

Vegetables to Grow:

SOW SEEDS OF: Artichoke (Globe), Asparagus, Beans (French, Wax, Climbing, Butter), Beet, Silver Beet, Cabbage, Cape Gooseberry, Capsicum, Carrots, Celery, Cress, Cucumber, Egg Plant, Endive, Herbs, Leek, Lettuce, Marrow, Melons, Mustard, Okra, Parsley, Parsnip, Peanuts, Peas (early varieties), Pepper (Capsicum), Popcorn, Pumpkin, Radish, Rhubarb, Rosella, Salsify (Vegetable Oyster), Spinach, Spring Onions, Squash, Sweet Corn, Tomatoes, Turnips.

Fruit and Orchard Programme:

Weed control is the only reason for cultivation at this stage. Apples and pears may be grafted. If the soil is dry at a depth of four inches or more, water it well. Deciduous pruning should be finished with by now. On flowering peach and ornamental plum trees prune off all shoots which have completed flowering.

OCTOBER—The Busy Month . . .

- ★ It's your last opportunity to plant certain trees and shrubs and put in a passion fruit. The grafted varieties transplant better. You can clear out your early precious flowering bulbs that have finished blooming, as they do not present a very cheerful appearance now, and they can be replanted in some vacant back bed to complete their growth. Keep the sweet peas well watered, and help out on the staking of plants with tender stalks, such as gladioli. Insects and fungoid pests germinate, but you can beat them to it if you spray and fumigate. Your tomato plants will harden off and could be disbudded, a virtue which would be appreciated by most vines. Pick off the spikes from the azaleas. Thin out the shoots of herbaceous plants. Divide the dahlias if they are ready and replant. Thin out the seedlings. That which we recommend for September goes for October in the cooler zones. Rub off the superfluous shoots that are on fruit trees and roses.
-

Flower Seeds to Sow:

Ageratum, Alyssum, Amaranthus, Antirrhinum (Snapdragon), Asters, Balsam, Begonia, Brachycome (Swan River Daisy), Calliopsis (Annual), Canna, Capsicum (Ornamental), Carnation, Celosia, Chrysanthemum (Perennial), Cilanthus (Sturt's Desert Pea), Cockscomb, Coleus, Convolvulus (Dwarf Morning Glory), Cosmos, Cuphea, Dahlia, Delphinium, Dianthus, Dimorpotheca (African Golden Daisy), Escholtzia (Californian Poppy), Gaillardia, Gerbera, Gladioli, Gomphrena (Globe Amaranth), Gypsophila, Helianthus (Sunflower), Kochia (Summer Cypress), Marigold (African), Matricaria (Camomile), Mesembryanthemum, Mignonette, Nasturtium, Petania, Phlox, Pomegranate, Portulaca, Rhodanthe, Rudbeckia, Salpiglossis, Salvia, Saponaria, Sesbania, Thalictrum (Lavender Shower), Tithonia (Mexican Sunflower), Torenia, Ursinia, Verbena, Viscaria, Zinnia.

Bulb Time for:

Achimenes, Agapanthus, Caladiums, Begonia, Gladioli, Gloxinias, Tuberous Begonias.

Vegetables to Grow:

SOW SEEDS OF: Artichokes (Globe), Asparagus, Beans (French, Wax, Climbing, Butter), Beet, Silver Beet, Cape Gooseberry, Capsicum, Carrot, Celery, Cress, Cucumber, Cyphomandra (Tree Tomato), Egg Plant, Endive, Herbs, Leek, Lettuce, Marrow, Melons, Mustard, Okra, Parsley, Parsnips, Peanuts, Pepper (Capsicum), Pumpkins, Radish, Rhubarb, Rosella, Salsify (Vegetable Oyster), Squash, Sweet Corn, Tomatoes, Turnips.

PLANT: Sweet Potato (rooted cuttings).

Fruit and Orchard Programme:

Most varieties of early peaches and many plums produce very small fruit if all fruit is allowed to mature, so now is the time to thin out. This is a good month to plant passion fruit and, while they grow best in light soils well provided with organic matter, some success can be expected in heavier well-drained land. Use animal manures freely. Newly-planted fruit trees will be pushing out much new growth. Remove these before they grow to any size. Don't over-water newly-planted citrus trees.

NOVEMBER in Your Garden . . .

- ★ This is a good growing month, so to give the newcomers a chance prune back some of the spring evergreens that have done with their blooming. After pruning, new strong growths will soon appear. Climbers can be treated likewise, and, even though you will be busy mowing lawns, don't forget to keep the clippings for mulching. When planting seeds, water well an hour or two before sowing, and cover the seed over with fine, dry soil. Never allow a seed bed to dry out, and use only a fine rose until the plants are an inch above the ground. If you have a cool position, try cinerarias for your winter show. Repot amaryllis after flowering, and give all your climbers somewhere to go. Train the melons and cucumbers, thin the grapes, and tie the shoots down. Mulch the rhododendrons and azaleas. Prune spring-flowering shrubs. A further planting of chrysanthemums can be made in manured ground. Hoe between the plants so that the weeds don't give your garden that neglected look.
-

Flower Seeds to Sow:

Ageratum, Alyssum, Amaranthus, Antirrhinum (Snapdragon), Asters, Balsam, Begonia, Brachycome (Swan River Daisy), Calliopsis (Annual), Capsicum (Ornamental), Carnations, Celosia, Clanthus (Sturt's Desert Pea), Cockscomb, Coleus, Convolvulus (Dwarf Morning Glory), Cosmos, Dahlia, Dianthus, Dimorpotheca (African Golden Daisy), Escholtzia (Californian Poppy), Gaillardia, Gerbera, Gomphrena (Globe Amaranth), Gypsophila, Helianthus (Sunflower), Kochia (Summer Cypress), Marigold (African), Matricaria (Camomile), Mesembryanthemum, Nasturtium, Petunia, Phlox, Pomegranate, Portulaca, Rhodanthe, Rudbeckia, Salpiglossis, Salvia, Saponaria, Sesbania, Tithonia (Mexican Sunflower), Torenia, Ursinia, Verbena, Viscaria, Zinnia.

Bulb Time for:

Amaryllis, Belladonna, Begonia, Dahlia, Gladioli, Lycoris.

Vegetables to Grow:

SOW SEEDS OF: Bean (French, Climbing, Wax, Butter), Beet, Silver Beet, Broccoli (White), Brussels Sprouts, Cabbage, Cape Gooseberry, Capsicum, Carrot, Cauliflower, Celery, Cress, Cucumber, Cythomandra (Tree Tomato), Egg Plant, Endive, Herbs, Lettuce, Marrow, Melons, Mustard, Parsley, Parsnip, Pepper (Capsicum), Popcorn, Pumpkins, Radish, Rhubarb, Salsify (Vegetable Oyster), Squash, Sweet Corn, Tomatoes, Turnips, Swedes.

PLANT: Sweet Potato (rooted cuttings).

Fruit and Orchard Programme:

Cultivation will be determined by weed growth to be controlled. Do so, if necessary, by shallow hoeing. A good watering should be given if the weather is dry. Remember that one good watering whenever required is better than a light sprinkle every few days. Fruit fly, codling moth and rust of peaches are to be controlled. Thinning the crop can be continued.

DECEMBER'S Doings . . .

- ★ Apart from watering there is not too much to do this month. A compost should be well used around shrubs, etc., so that the garden will be well fed if you go away on holidays. Finish the staking; have all your seedlings in by now to dodge the heat-wave that may come within the next month or so. Spend some time with the hoe early in the month so that you don't have the weeds taking charge over Christmas, when you have other things to do. You will still want to think of your autumn displays. If you wish to cover bare ground quickly until such time as you are ready, sow nasturtiums that will bloom within a few weeks after sowings. They don't need much attention and they look ever-fresh in the blistering heat of mid-summer. Pinch back the chrysanthemums if they are over a foot high. Why not enjoy the coolness of the green-house? Look up our Ferns Section to see how you can have a mountain glade at your back door. Don't forget to add a spoonful of fertiliser when you are carrying the watering can.
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Flower Seeds to Sow:

Ageratum, Alyssum, Amaranthus, Antirrhinum (Snapdragon), Asters, Balsam, Brachycome (Swan River Daisy), Calliopsis (Annual), Capsicum (Ornamental), Carnations, Celosia, Clianthus (Sturt's Desert Pea), Cockscomb, Coleus, Convolvulus (Dwarf Morning Glory), Cosmos, Dianthus, Escholtzia (California Poppy), Gaillardia, Gerbera, Gomphrena (Globe Amaranth), Helianthus (Sunflower), Hunnemannia (Mexican Poppy), Iceland Poppies, Kochia (Summer Cypress), Marigold (all varieties), Nasturtium, Pansy, Petunia, Phlox, Portulaca, Primula, Rudbeckia, Schizanthus (Poor Man's Orchid), Stocks, Sweet Peas, Tithonia (Mexican Sunflower), Torenia, Verbena, Viola, Viscaria, Wallflower, Zinnia.

Bulb Time for:

Amaryllis Belladonna, Gladioli, Iris (Bearded), Iris (Regelio Cyclus), Lycoris, Nerine, Sternbergia.

Vegetables to Grow:

SOW SEEDS OF: Beans (French, Climbing, Wax, Butter), Beet, Silver Beet, Borecole, Broccoli, Brussels Sprouts, Cabbage, Cape Gooseberry, Carrots, Cauliflower, Celery, Cress, Cucumber, Egg Plant, Herbs, Lettuce, Marrow, Melons, Mustard, Parsley, Parsnip, Popcorn, Pumpkins, Radish, Rosella, Salsify, Squash (Bush), Sweet Corn, Tomatoes, Turnips.

PLANT: Sweet Potato (rooted cuttings).

Fruit and Orchard Programme:

Again weed control is the main object. If the earlier cultivations have been done properly, shallow hoe work will be all that is necessary. Irrigate if necessary.



Australia's

CLIMATIC REGIONS

How Environment Affects Plant Life

While we have published separate Victorian and N.S.W. editions of this book, the Australian climate as a whole reflects an overlap and a certain similarity that enables the hardier varieties to thrive in every State, provided there is rainfall or water. As most home gardeners do not attempt growing special species without adequate watering facilities, or fertilisation to overcome barren soils, a book such as this can become general as far as all States are concerned. The map on page 5 is a useful guide, developed by Andersons Ltd.

TYPICAL WARM CLIMATES

Wet, Tropical Forest, with a short dry season in winter, such as Cairns; or Wet, Savanna, with a drier winter (such localities as Townsville, Darwin); Semi-dry, grassland country, with light rains, as Western Queensland and Carnarvon, W.A.

TEMPERATE LATITUDE CLIMATES

Wet zones include Roma, Bundaberg, Brisbane, with a warm climate, and Tamworth, Sydney, Bendigo, with an average cool climate.

A long summer is usual for such places as Toowoomba and Canberra. They are both in the highlands, subject to frosts.

THE CANBERRA TABLELAND CLIMATE

This has a growing season extending from October to March, and there are days of 90 deg. in mid-summer, but the nights are usually cool. In September up to 10 deg. of late frosts may come to destroy tender crops, fruit and flowers. Until October it is wise to plant only hardy crops like Red Beet, Silver Beet, Peas, Lettuce, etc.

THE OCEANIC ZONE

This is the uniform rain region where yearly temperatures are more moderate than the range inland or on the tableland above 3000 ft. The influence of the ocean in regulating the temperatures makes it the most important region for vegetable growing. The area extends along the tablelands of Northern N.S.W. right into Victoria. Near Moss Vale it sweeps to the South Coast of N.S.W. and follows the Alps and the coast of Victoria to Portland. It is a potato-growing country.

Gardening Conditions...

New South Wales and Queensland

Every Australian knows the limited range of most of our wildflowers, such as the large waratahs found only between Sydney and Newcastle. They can, of course, be grown elsewhere provided conditions are simulated. As all garden plants have sprung from wild stock, indigenous to certain climate, soils and moisture conditions, it follows that success will come more readily to the gardener who knows the limitations of his local environment for exotic plants, whose growing conditions he must imitate.

CLIMATE

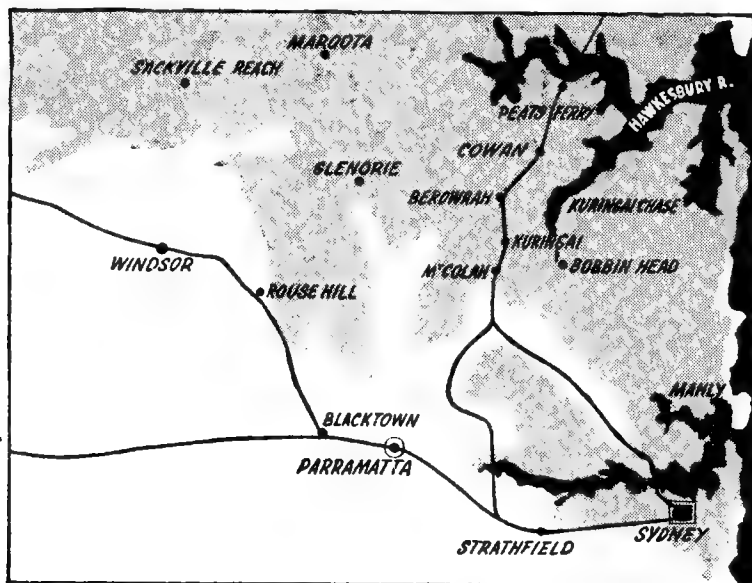
Temperature and rainfall are the major considerations in growing. On the coastal belt, the Great Divide, and inland are

three different climates, the latter like the veldts of South Africa; the tablelands suit the cool vegetation, and the coast is temperate.

It would be misleading not to divide the East Coast into its rightful zones. Our map on page 5 shows the demarcation.

Getting down to our zones again (see previous chapter) it follows that geography has little to do with gardening—the fact that Tasmanian apple varieties thrive at Stanthorpe in Queensland is evidence of this.

The scientific gardener, therefore, studies his average temperature, rainfall, climatic region and soil — for this is the food of the plant.



Hawkesbury sandstone area extends into some regions of Sydney's northern suburbs.

The Soils and the Varieties for areas around Sydney . .

★ *Rich, well-drained soil is the basis of good gardening. But what if the quality of the soil is poor? In these notes, republished by kind permission of "Your Garden," an expert identifies and describes the areas around Sydney where the soil is not naturally fertile, and shows how even the most unpromising soil may be improved by good husbandry.*

SANDSTONE

Although a greater part of the soil in the metropolitan and near-metropolitan area of Sydney is Wianamatta Shale, there are vast areas of sandstone, too.

The map on page 27 shows the area north of Sydney Harbour.

Soils of this type are usually of low fertility if left in their original state. They are of free drainage, but mostly of poor base content, and free from calcium carbonate.

Through leaching, the surface layer has lost a large amount of its original base, and become acid in its reaction. To test this, try out some soil, either with a litmus paper or by using some of the sampling equipment available in Sydney shops.

If the reaction with a litmus paper is "red," the soil will be of acid contents.

With little surface growth, the leaching by water is accentuated, tending to more and more soil impoverishment. Sydney's soils are usually deficient in humus or organic matter, and the sandstone soil is no exception. It is not just a matter of tending what might grow in the soils, but what should be done with the soil to bring it to fertility.

The use of lime has a good effect on such soils—but this must not be used if any of the acid-loving plants, such as *Rhododendrons*, *Azaleas*, *Camellias*, *Kalmias*, and such like are to be grown.

The use of tan bark, sawdust, and sulphate of ammonia all tend to making a soil more acid. It would be better, therefore, to do without these when adding organic matter and fertilisers.

The main source of organic matter in soil is the rendure of plants added naturally or artificially to the soil, and small amounts from animal remains or soil organisms. Years ago organic manure, cow and stable,

was plentiful, but in later years this has been almost unprocureable on any large scale.

Humus is said to supply a source of energy to the soil population, to prevent the dissipation of soil nitrogen, and also to contain true acids. The resultant dark colour reacts favourably on the temperature relationships of soil.

It is, therefore, necessary to sow and dig in cover crops such as mustard, rape, peas, barley, etc., or to add straw, vegetable refuse compost. In fact, anything which will rot away in the soil excepting such pests as couch grass, oxalis, and sorrell, though these are often recommended, but I would never use them, as the danger of spreading is too great. Poultry manure is nitrogenous but low in potash. Seaweed can be used fresh, or rotted it is valuable for nitrogen, potash, and common salt. Phosphoric acid content is very low.

Horse, cow, and pig manure vary according to animal feed. Horse manure is hot and rapidly ferments; cow and pig manures are cold.

Guano—the residue from sea birds—is a very active manure and rich in nitrogen, phosphoric acid, and potash.

Any of these manures can be worked into the top section of the soil. Such fertilisers as blood and bone and dried bone can also be added, but I would strongly advise the planting and digging in of green crops as a major consideration. It is well to remember, too, that a young crop is much higher in nitrogen than an old crop.

The continual use of superphosphate without the addition of green crops or incorporating of organic manure and compost will soon cause soil infertility. You will not grow good flowers or high-class vegetables in just poor soil only.

SOIL CONDITIONS

SHRUBS WORTH GROWING

Here are some if your soil is treated as suggested above:—

Camellias: Suggest these be planted in a shady spot where they do not get the hot afternoon sun. They do not like the hot wind, so a protected spot is best, in the shade of trees. An acid soil is also best. Don't give lime. They will grow well in the same situation and soil as the rhododendron.

The large open types, like Lady Clare and Golden Temple, are very popular nowadays.

Cydonia, or Japanese Quince, is best grown against a wall in semi-shade, or even in direct sun. It is quite hardy, but does not require a rich soil. Perhaps the two most popular varieties are *C. lagenaria*, growing to 6-7 ft., and the smaller grower, *C. maulei*.

Clanthus Puniceus, with flowers like a lobster's claw, of brilliant red, will grow against a wall in the sun. It has quite an unusual flower, and came originally from New Zealand.

Cotoneaster horizontalis grows fan-shape against a wall to a height of 8 ft. It has an attractive orange-red berry, and will grow almost everywhere. The small leaf foliage is interesting also.

Jacaranda: A small growing tree, growing well in the warmer spot, but a little frost tender in the early stages. Its blue flower is known throughout Australia. The jacarandas at Grafton, N.S.W., are known throughout the world.

Felicia angustifolia is another dwarf shrub which likes a sunny spot. It has a deep lilac-coloured flower, and grows to 3-4 ft. Does not require cultivation.

The Shale-Sandstone Combination

(WOLLONGONG AREA)

The "combination" soil of Hawkesbury sandstone and Wianamatta shales covers a big area of Sydney, and may be found anywhere near the borders of the shale and sandstone areas delineated in the map previously shown.

The home gardener in this "combination" soil faces, as a rule, more difficulties than those in other districts around Sydney.

The soil in its native state is just like coarse sand. Humus, organic matter, and

even plant nutrients are all missing, and you will find practically no earthworms.

This is not to say that you cannot grow in an admixture of Wianamatta shale and sandstone, provided you are willing to build up your soil.

The best way of attacking the problem is to begin adding humus. Any green crop of peas, barley, field lupins, mustard, or weeds (excepting sorrell, kikuyu, and couch grass) can be turned into the soil.

This, when rotted, will form a humus or water-holding content in the soil. Seaweed which has been left out in the open for a couple of months also can be used. Malt comings, spent hops, tan bark, or partly decomposed sawdust will be found satisfactory.

By far the best medium is organic manure, such as cow manure, though stable manure is useful, particularly if it has straw worked through it before adding it to the soil.

Fowl manure, if used with discretion, is one of the best media, but do not over-use this when fresh, as it may burn the plants.

Fresh fowl manure is quite useable, however. Twenty acres of vegetables have been grown in sandy soil in this area, with only rain water. Fowl manure fresh from the pens was harrowed into the top soil. The parsnips, carrots, cabbages, and rhubarb grown were almost perfect. But not too heavy a dressing of manure was used.

When growing seed in the open, try a sprinkling of damp sawdust or rice husks over the surface of the soil. This helps to conserve the surface moisture, and prevents the soil surface from caking.

Lime could be added—this has a tendency to bind the soil—but do not use it at the same time as manure. A little Epsom salts and phosphate is also useful.

Dried blood or blood and bone can be used also. This is difficult to obtain, but a little goes a long way.

When the soil has been prepared as suggested you can grow almost anything, but, of course, lime and blood and bone must not be added if you are growing rhododendrons, azaleas, and other acid-loving plants. Drooping or wilting of rhododendrons has been caused by a heavy dressing of blood and bone; it would have been better to have used a sprinkling of sulphate of ammonia.

RECOMMENDATIONS

What to Plant

In these soils it is better to plant the hardy type of shrub instead of those which are a little tender.

Here are a suggested few and their approximate height at maturity:—

Blue Marguerite or *Agathaea*: This will grow to about 2 ft. and will flower most of the year. Has a daisy-like flower with a yellow centre.

Bevera Sessiliflora: This is an Australian native with a purplish flower, growing to about 3 ft.

Caryopteris or *Blue Spirea*: Another very hardy blue-flowering shrub, growing to 3-4 ft.

Cistus or *Rock Rose*: Does best in a hot, dry spot. Can be had in pink, yellow, and white. Grows to 3 ft.

Felicia: This grows to 4 ft. and does best in a dry spot. Has masses of lilac daisy flowers.

Prostanthera: Commonly known as the Australian mint bush, growing to 4-6 ft. One of the best native shrubs. Will do well in dry spot. Rich purple flowers.

Veronica: A hardy 4 ft. shrub. Can be grown almost anywhere.

Callistemon or *Bottlebrush*: Another Australian native, growing to about 7 ft.

Habrothamnus: A red or orange 7 ft. shrub which will grow almost anywhere. Also known as *Cestrum*.

Cydonia or *Japanese Flowering Quince*: Grows to about 6 ft. in either red, pink or white flowers, which bloom in early spring.

Escallonia: Will grow to 7-8 ft. Will flower over a long period with a red tube-like flower in small clusters.

Sandy Loam and Volcanic Necks

There is very little substance in this type of soil. Nowadays cow manure is not so easy to get. In some way, therefore, you must build up the humus content of the soil.

For vegetables, the best ingredient is fowl manure mixed with straw.

Sandy soil is not suitable for all shrubs and plants. An ideal type to grow in it is

broom, which should be nipped back when the plant is young to make a sturdy bush. If overfed or grown in rich soil, broom grows tall and spindly, and is likely to be blown down by the wind.

Forsythias, *Prunus serrulata* and *P. Pisardi*, lavenders, native mint bush, *felicia*, *buddleia*, *leptospermums* and a host of others will grow in sandy soil.

This is naturally an acid or lime-free soil. If you desire to grow acid-loving plants in it, such as *kalmias*, *rhododendrons*, *azaleas*, and, to a smaller extent, *camellias*, you must not add lime.

You can always detect an acid soil right away if there is a great crop of sorrell. This is a decided nuisance, but it will soon clear up with a few dressings of lime.

Perhaps the first choice is the *rhododendron*, which requires some shade or protection from the sun and is best grown under the shade of other trees, where it receives only filtered light. Soil must not be cultivated around the *rhododendron* trunk. Any mulch of decayed leaves, decayed sawdust, or tan bark or decayed lawn clippings used as a mulch will keep the root system cool and help in retaining moisture. Decayed cow manure also is ideal, while many get good results with sheep manure.

Select a few *rhododendrons* from *Pink Pearl*, *Alice*, *Alarm*, *Warrior*, *King George*, *Corona*, *Countess of Athlone*.

The *azalea* likes almost the same conditions and treatment, but is a little hardier.

Another favourite in this type of soil is the *camellia*, which flourishes in conditions similar to those for *rhododendrons*. The *camellia* also likes a cool root system.

The yellowing of *camellias* in the spring is often caused by allowing them to dry out the previous summer. Select a few from *Lady Clare*, *Czar*, *Alba plena*, *Nagasaki*, *Chandleri elegans*, *Spencer's pink*, *Golden Temple*.

Kalmia latifolia has a cup-shaped small flower, and grows to about 8 ft. high. This grows well where the *rhododendron* grows. *Clethra*, with the exquisitely scented *Lily of the Valley* flowers, will grow up to 12 ft. high. It is evergreen and is quite hardy.

PLANT PREFERENCES

The waratah is hardy, and worthy of a place also, and magnolias, of which there are a very wide range, give quite a show of blooms. *Magnolia grandiflora*, *M. Soulangeana*, *M. Stellata*, *M. Campbelli*, are just a few suggestions.

Most liliiums will also grow in the volcanic country, and gladiolus seem to get a better colour, particularly if the soil has had plenty of humus added. You will find that the earlier planted corns are not affected with disease as much as the later ones, which flower in the autumn.

Ericas, rowan tree, *hydrangea* (blue shade), *cotoneaster*, and *cornus* are other shrubs you may like to try, while *hyacinths*, *daffodils*, and *crocus* also grow well in the volcanic soils.

For your acid-loving plants, work in cow manure, stable manure, old tan bark, or decayed sawdust. Any soil, of course, is better for the working-in of green crops. This helps the soil's water-holding capacity,

and saves much of the watering in warmer weather.

Volcanic soil does not hold the water well. It is usually porous, and this must be remedied unless you are prepared to keep the hose going in summer.

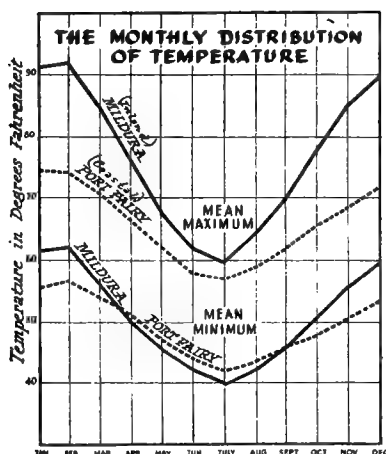
Volcanic soil is usually deficient in manganese and boron. If this is so, a little borax and Epsom salts will help. It does not require a great deal.

Chemical soil-testing sets are available to you in several city shops.

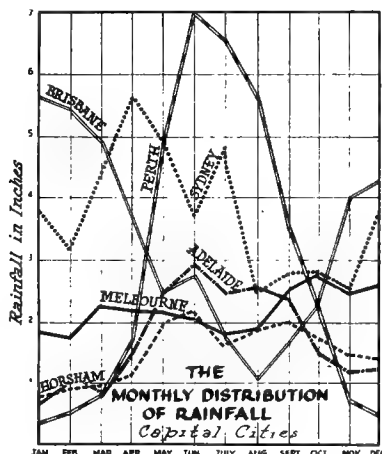
When growing bulbs in this type of soil, use bone flour for daffodils. Don't use organic manure for them.

All soils, in fact, can be made to suit our requirements. Just recently, for instance, apparently worthless soil near the South Australian border was turned from practically a desert into excellent growing soil by the addition of a little trace element.

TEMPERATURE — Month by Month. Typical Inland and Coastal Variations



RAINFALL Monthly Averages for Capital Cities



. . . The . . . **Victorian Environment**

by REUBEN T. PATTON, D.Sc. (Melb.), D.I.C. (London),
M.F. (Harv.), F.R.H.S.

(Lecturer in Botany, Melbourne University)

FEW places in the temperate regions of the world exhibit such an amazingly wide variety of natural vegetation, Earth's Green Mantle, as does the small State of Victoria, for composing this green mantle are the world's largest hardwood trees, the Mountain Ash, widespread grasslands producing the world's finest wool, and forests of Jet Black Ironbark trees, aptly named, whose timbers are perfectly sound after fifty years of use as railway sleepers. Nor is this all the surprising variety of our plant covering, for in the north-west of the State our largest river wanders slowly past the mallee scrub which stretches out to the desert's fringe, while at the other end of the river are deep snow and intense cold in the winter, which give way in the summer to a blaze of alpine flowers.

These are surely contrasts for so small a State, but the great diversities are not finished, for in the east of the State there are true jungles, with great climbers hanging from the trees, and even a palm is present. This vegetation is a thrust down from the tropics along the east coast of Australia, but it soon finishes after it turns the corner at Cape Howe, for the cold waters of Bass Strait soon exert their cooling influence. Another tropical feature is the mangrove, which is excellently developed in Westernport.

Where All Types of Vegetables Thrive

Thus within our borders there is an exceedingly wide range of types of vegetation, from semi-desert to tropical, and coastal to alpine, all compressed into an extremely small area, for Victoria is the smallest of the mainland States and is only two-fifths of the next smallest, New South Wales. Victoria, despite its extremely varied vegetation, is even smaller than Great Britain, but the great variety in its Green Mantle is due to the great variation in the environment, which in turn is the result of a large number of factors — a small change in any

one of these may produce a complete change in the vegetation, as, for instance, forest giving way abruptly to grassland. The factors of the environment are rather complex and not always entirely independent of one another, but for the sake of simplicity they will be considered separately.

The actual amount of rain received in a year does give a very good clue both to the natural vegetation and to the type of agriculture that can be carried on, but the distribution of the rainfall over the months of the year is also of first importance. At Melbourne, average amount received monthly does not vary greatly — February with 1.76 in. is the driest month, and October with 2.60 in. is the wettest. The even character of the rainfall is better realised in the fact that in the six months October to March 13.02 in. are received, while April to September receive 12.51 in.

However, in the northern areas particularly, the six months April to September are considerably wetter than the warmer six months. Shepparton, an irrigation district, receives 8.05 in. of rain in the months October to March but 11.14 in. in the colder six months, and Horsham, in the west of the northern plains, receives 6.84 in. and 10.86 in. for the same periods.



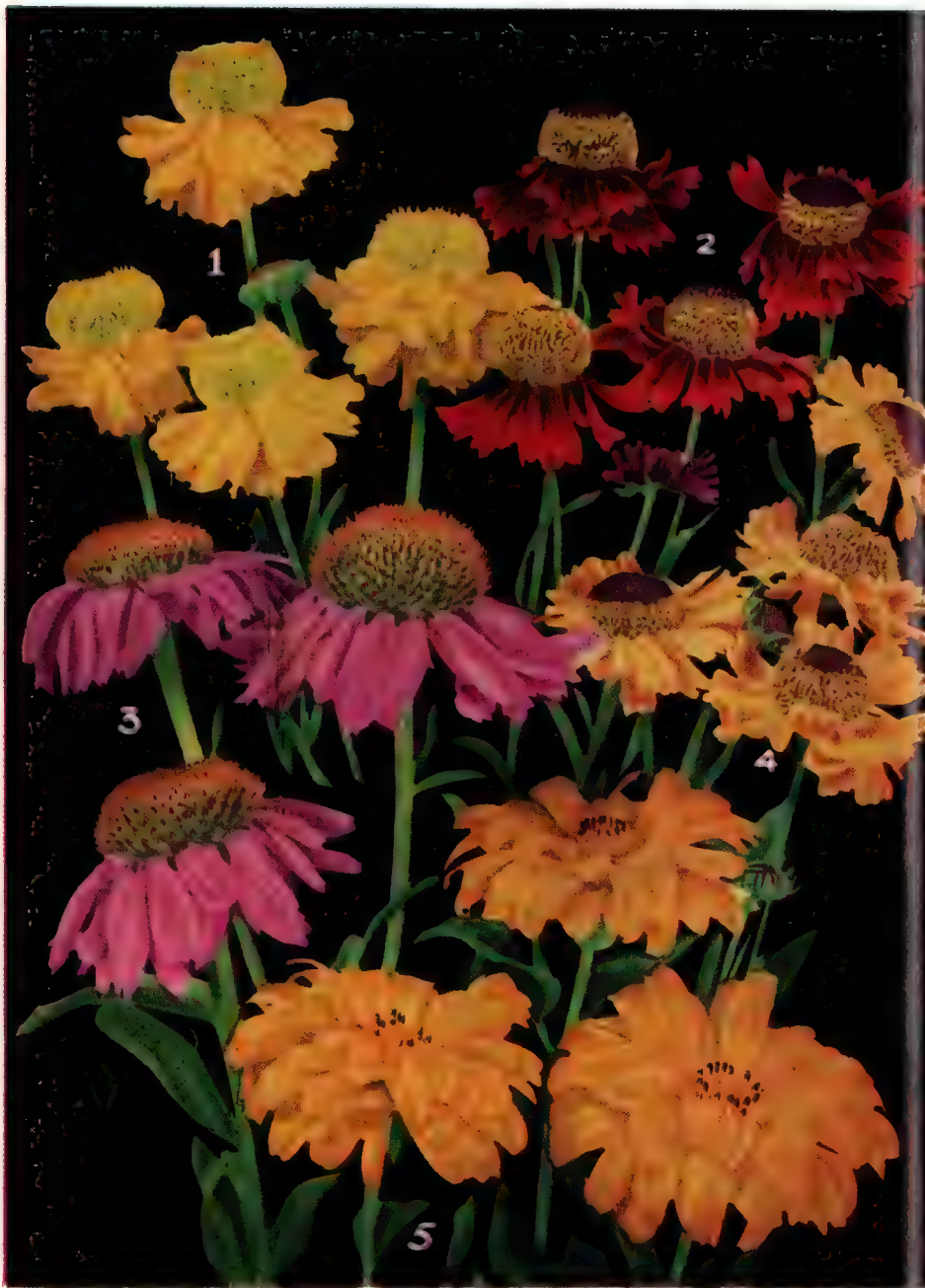
AUTUMN FOLIAGE TREES AND SHRUBS

No. 1—*Viburnum Opulus sterile*
No. 2—*Koelreuteria paniculata*
No. 3—*Quercus palustris*

No. 4—*Cornus Baileyi*
No. 5—*Liquidambar styraciflua*
No. 6—*Fraxinus Raywoodii*

No. 7—*Crataegus cordata*
No. 8—*Acer palmatum*
No. 9—*Rhus succedanea*

[Illustration by courtesy of Hodgins Nurseries Pty. Ltd., Essendon, Victoria]



SHOWY SUMMER-FLOWERING PERENNIALS

No. 1—*Helenium aurantiacum*

No. 2—*Helenium Fire King*

No. 3—*Rudbeckia purpurea*

No. 4—*Helenium Wyndley*

No. 5—*Heliopsis scabra*

[Illustration by courtesy of Hodgins Nurseries Pty. Ltd., Essendon, Victoria]

THE VICTORIAN ENVIRONMENT

This distribution of rainfall is known as winter rainfall type, and it is very advantageous to wheat production, as most of the rain is received in the growing period, while toward harvest time the rainfall declines.

The winter type of rainfall is not strongly pronounced in Victoria, but at Perth, W.A., it is very striking, for the bulk of the rain falls in the winter months when temperatures are lowest, and therefore plant growth is very backward. In summer, when growth should be very active, there is a deficiency of moisture in the soil, due to the small amount of rain received.

There is still another viewpoint of rainfall which has also a very important bearing on plant growth, and therefore on land use. It has already been noted that the north-west of the State has a very low rainfall, even as low as 10 in. in the extreme corner. Very low rainfalls are very hard on plant life and make horticulture almost impossible, but when that low amount is very uncertain conditions for plants become extremely difficult. As an example, Mildura has an average rainfall of 10.56 in., but this city of sunshine, aptly named, has received only 4.11 in. in a year and has had eight consecutive years when not a single year reached the average. Such rainfalls have a very low degree of reliability and make life hard, but when irrigation is possible the combination of clear, sunny skies and abundant water creates the luxurious green landscape — a striking contrast to the grey-green native vegetation still to be seen close to Mildura. Irrigation works wonders in a thirsty land, but the amount of dry land is very large while the supply of water is very limited, and therefore the extension of irrigation is very limited.

In contrast to the low reliability of the rainfall in the low rainfall areas are those parts of the State where the rivers have their sources, for here the rainfall and the reliability are good, and are favourable for development of vegetation that will protect the soil cover and retard the run-off, both necessary if irrigation is to continue.

Incidence of Frost

While elevation of the land has a marked effect on the amount of rain received, it has also a very great influence on temperature, because for every 300 ft. of ascent the temperature falls one degree Fahrenheit. In a warm climate this lowering of temperature increases the range of production of

various food crops which do as well or even better in a cooler climate. Many of our upland areas are very important as our main potato districts, such as Romsey, Trentham and Ballarat, and another striking example of this effect of lowered temperatures is seen in the Dandenong hills, for here the berry fruits grow excellently, and it is also highly favourable for flowering bulbs.

However, while the lower temperatures favour a wider range of crops being grown, they also favour the occurrence of frosts, and these can be exceedingly destructive. In the country from Romsey to Ballarat potatoes are largely grown at elevations well above 1000 ft., and these crops are at times severely damaged by frosts. As agricultural settlement is not strongly developed in the highlands, particularly in the east, there are but few records available, but the influence of elevation may be seen in the fact that Omeo, 2108 ft. elevation, has, on the average, 72.9 frosts in the year, while Hotham Heights, at 6100 ft. elevation, averages no fewer than 167.8 in the year.

Damage caused by frosts is, however, not restricted to the upland country, for very severe frosts can occur in the inland lowland country, particularly along the lower part of the Murray River, while in the south, along the coast, frosts are infrequent. Thus Merbein, in the Mildura district, has an average of 8.5 severe frosts a year, while Warrnambool, nearly due south, has less than one a year. Even Melbourne averages less than one a year. Shepparton, another inland town, where irrigation is extensive, has more than six in the year.

The Coastal Climate

Along the coast the sea acts as a very modifying factor against extremes of temperature, and as a result the range of temperature — that is, the difference between the average highest and average lowest temperatures — is very small, but as we go further from the sea the oceanic influence is lost and the range increases. Thus, while the range of temperature for the year is only 14.7 for Warrnambool, it is 25.8 for Mildura. As the temperatures given are average annual, they give only a general picture of the decline of temperature, but where the average monthly temperatures are considered, and shown in a diagram, the great differences between the distribution of temperature over the year of stations on

THE VICTORIAN ENVIRONMENT

the coast and inland are more fully realised. In our chart are shown the average maximum and average minimum monthly temperatures for Port Fairy and Mildura. At Mildura the maximum temperatures fall sharply from February to June (a total of over 30°), while the fall at Port Fairy is only 17.4°. On inspection of the chart it will be seen that the monthly minimum temperatures for Mildura are lower than for Port Fairy for the six months April to September. These lower temperatures found inland explain the greater liability of frosts in districts, although they may be of low elevation, removed from the sea.

Severe frosts, therefore, occur in two totally distinct localities, those of low elevation distant from the coast and those of high elevation.

The Soils of Victoria

Before, however, giving a general view of the soils of Victoria and keeping the already mentioned limits in mind, it should be remembered that, while soil fertility is a first necessity for the broad-acre land settler, it is not necessarily so for the small-scale horticulturist; for the latter can, by his attention to and treatment of the land, largely make up for some of its deficiencies. This is particularly so in the densely populated, land-hungry areas of the world, where the shallow soil is scraped into pockets and a low stone wall built on the downhill side to prevent erosion. In other parts one may see land, loose and sandy, reclaimed from the sea, covered with straw, which is pegged down to prevent both it and the soil being blown away; yet this land becomes ultimately very fertile. However, our point of view is not that of the small holder but that of the broad-acre holder, who seeks land of good natural fertility and texture, and it is this point of view which is kept in mind in the discussion on Victorian soils.

In the Mallee, which lies in the north-west and occupies about one-fifth of the area of the State, there are three major kinds of soil — firstly, a deep loose white to brownish sand; secondly, a very sandy brown soil with much lime below, occurring either as limestone or rubble, and thirdly, a reddish to brown sand or sandy loam which is fairly deep.

The first kind, covered by a heathy kind of scrub or by porcupine grass, together with a mallee eucalypt, is loose and uncon-

solidated, and when the plant growth is removed it very easily erodes with the wind. Most of this is still under virgin scrub, and there does not appear to be any prospect of utilising this land for agricultural purposes.

The second kind was originally covered with mallee eucalypts, but this cover has been largely removed because the soil has proved good wheat land. However, the soil in the northern parts is lighter than in the south and is therefore readily moved by the wind, and in some parts settlement has been abandoned. More may have to be returned to nature in the future.

The third type is very limited in area and is mostly close to the River Murray. This is fortunate, for it is admirably suited for irrigation and for citrus, grapes, and other fruits grown upon it. This soil carried originally quite a good forest, which is very remarkable considering that the rainfall is below 12 in.

Excluding the Mallee, the northern plains, which stretched westwards between the Murray and the highlands from Rutherglen to the South Australian border, were natural grasslands in places quite devoid of trees; in others with grey box sparsely distributed over them. Buloke was also occasionally present, but in the Wimmera it formed rather dense clumps. The soils of these grasslands is loamy, in some places heavier than in others, but the natural vegetation did not distinguish between them. In colour red predominates, though there are areas of black (sometimes called grey) soil, particularly in the Wimmera, but there were also grasslands. Being natural grasslands, they were used early for wool production, but later became wheat lands. Dairying is also carried on, and in some parts there are irrigation settlements.

As the winter rain is sufficient for food pasturage and for the production of wheat, some additional water is needed to supplement the rainfall so that a greater range of production can be achieved, particularly vegetables. As our countryside cannot by any means be regarded as effectively occupied, and a larger population is needed, these plains probably offer the greatest opportunity for intensive land settlement in the Commonwealth. This portion of the State, by its combination of a good soil and favourable climate, gives the chance, provided extra water is supplied, of settling a dense peasant population who would use the land in some co-operative system, by

working it as a combination of agriculture and horticulture, and thus give a varied and continuous production.

To the west of Melbourne lie the extensive basalt plains, which stretch all the way to Portland. There is no uniformity in the development of the soil, for in some cases, as near Melbourne, it is deep and red and easily cultivated, but in other parts the surface is strewn with stones. Where conditions are suitable, both onions and potatoes are grown, but the total area of cultivation is very small. As the plains were typically grasslands and the amount of arable land is not great, the present type of land settlement appears to be in the best interests of the State.

Coastal Sandy Conditions

Almost right along the coast from east to west is a narrow belt of grey sandy soil, from shallow to great depth, covered in places by heath and in others by forests, chiefly consisting of Stringybarks and closely allied species. The best of these lands was on the eastern side of Port Phillip Bay, and here developed the great market gardening area to the south-east of Melbourne. The soil was dark grey, very deep, well drained and contained a high degree of humus, and its fertility was maintained throughout the long period of market gardening. With almost an absence of frosts, with a mild winter, no monthly temperature falling below 40° F., which is about the limit of plant growth, and with a good rainfall supplemented by a water supply, this area produces a very wide range of vegetables and is the standard by which all other areas must be judged. These grey sands are abundant in the south-west of the State and also extend northward along the South Australian border, but the soil is not uniform throughout. Around Portland there are great possibilities and market gardening is already carried on there, but the summers are much cooler than at Melbourne and this is a limiting factor in production.

The Good Earth

In the east of the State, beyond Orbost, is a long stretch of similar land, but this is heavily forested and, as timber is an important requisite of a developing country, the clearing of such land is not desirable. The other areas of these grey sands do not appear to be of any value for horticulture except the country extending from Traralgon to the Tambo River, which includes the

important towns of Maffra, Sale and Bairnsdale. This large area, although generally shown as belonging to the grey sands, actually does not, for its soil is loamy in character and was natural grassland, dotted with forest red gum, the only occurrence of this species in coastal regions. This area is suitable for intensive settlement, for it has a good rainfall. The six summer months receive slightly more than the six winter months April to September, and there are high rainfall catchments on its boundary. With its warm summer temperatures, Maffra actually having higher mean minimum temperatures than Melbourne, this region must prove in the future to be an important production area of summer-grown vegetables as beans, pumpkins, lettuce and tomatoes, but the mean minimum temperatures of the three months June, July, August, are all below 40° F. and the danger of severe frosts is serious. These low temperatures will prevent the early planting of potatoes and could seriously retard the growth of autumn-planted vegetables. The frosts will also have an effect on the development of orchards, as the early flowering varieties of fruit trees which bloom in September can be affected by the frosts. Apples, on the other hand, being late in flowering, should do well.

Highland Frost Country

On the whole the highlands, both east and west, can only be sparsely settled, for either the country is too hilly or the soil is too thin, and the removal of the trees would lead to rapid erosion. The frost danger is also very serious, and the opening up of parts of the forests may lead to "frost holes." In the eastern highlands there are good natural grasslands, but these are not suitable for horticulture.

In the western highlands are good areas of good volcanic soil, which is used particularly for potatoes. The remainder is poor but carries fairly good forest, as these highlands are the source of the Campaspe, Loddon and Wimmera.

The southern highlands, South Gippsland and Otway, originally carried first-class forests, but these have been largely destroyed and much of the land, after being selected by settlers, was abandoned. The soil is rich, but it is on steep slopes, and this is sufficient to prevent cultivation. In the far Western District, where Coleraine and Casterton are situated, is an area similar to the

two preceding, but it is at a much lower elevation and was good natural grassland, and has remained so.

Soils Around Melbourne

As the greater proportion of the population of Victoria is resident in the metropolitan area, the relationship between the environment and horticulture may be considered in greater detail. The same climate operates over Greater Melbourne, but there are very great differences in the soils, and therefore there are great differences in the home gardens of the different suburbs.

To the north and west of the city the country is particularly flat and the soil, usually black, but red further afield, is very heavy to work owing to its very great water-holding capacity. This is aggravated by the difficulty of draining the land, owing to its lack of contour. In a wet year very little work can be done on such soil, but a certain degree of improvement can be made by working in, when conditions are favourable, of large amounts of organic matter, very rough stuff for preference, and thus raising the beds well above the paths. Both drainage and fertility will be improved.

To the east of Melbourne the soil is also very clayey, very sticky when wet, but breaking into fine dust when dry. The soil is very shallow in most parts, but as the country is gently hilly there is good surface drainage and, although a great quantity of moisture is retained, waterlogging of the garden should not occur. The shallowness of the soil is the most serious feature, and this cannot readily be relieved, as the addition of sandy soil is costly, but the addition of organic matter will give better aeration and year by year make the soil more friable. The enclosing of garden beds by boards, bricks or other material will assist in increasing the depth of soil, but very careful attention will have to be given to drainage.

To the south-east of the city lies the grey sands area, where the soil is deep to very deep, and where the country is gently undulating, thus providing natural drainage. The disadvantage of this soil is its lack of water-holding capacity and its readiness to dry out in summer, but its great advantage is that it can be worked every month of the year and the soil does not set in clods even if worked when it is wet. It is admirably adapted to root crops, for these can readily grow downwards and equally readily expand in girth in the loose, friable soil.

Melbourne's Climate for the Garden

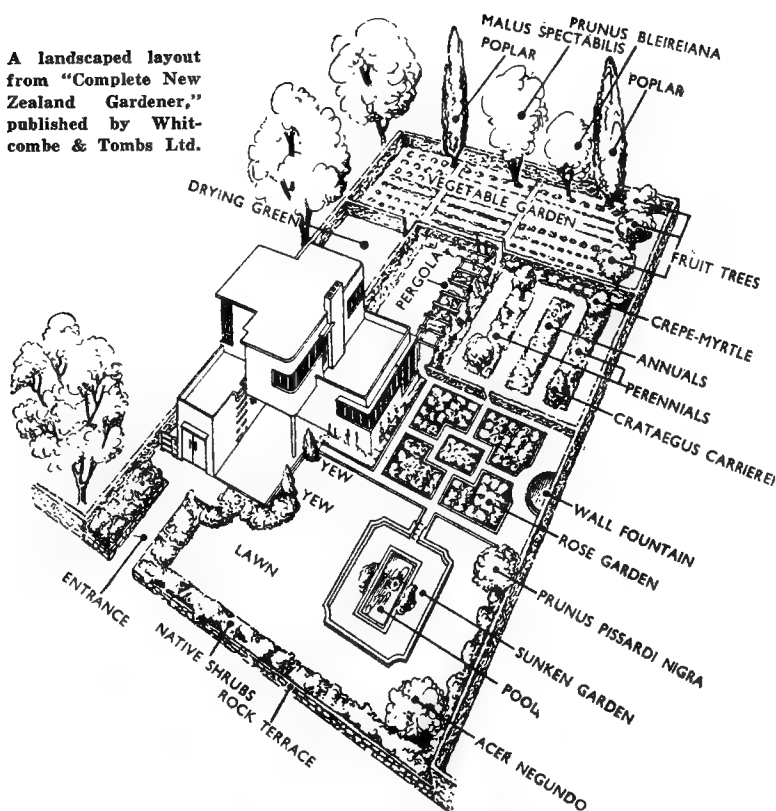
Provided the soil is in good heart there is almost no limit to what can be grown, owing to the extremely good climatic conditions, assisted by a good water supply. So favourable is the climate that in our parks we may see growing together trees from the cool temperate to the tropics, and in our own gardens we may have flowers in every month of the year, for there is no adverse season.

Summer is decidedly warm, but not hot enough as a rule to cause severe damage, although in some years hydrangeas are ruined and young French beans will be shrivelled on the plants. Both in the flower and vegetable gardens a wide range of varieties can be grown. The favourable summer season covers actually four months, for the average temperature for March is only slightly lower, about one degree, than that of December, and this holds good for other areas in the south. In March, summer-loving plants are still growing strongly, for autumn has not set in, and both vegetables and flowers are probably at their peak in this month. In April, autumn really arrives and the gardens begin to decline, but only gradually, and in the vegetable garden the summer vegetables, as French beans, tomatoes and lettuce, will continue to produce, but pumpkins and marrows will be most probably heavily mildewed.

Winter is by no means a period of inactivity for plant life, for the lowest average temperature for July, the coldest month, is above 40° F., and in the flower garden bulbs, commencing with yellow jonquils in May, can give a good display. In the vegetable garden, peas, broad beans, cabbages, leeks, white onions are growing steadily. Thus there is no slack period, and the kitchen garden can supply fresh vegetables every month of the year — not only supply but give a very wide variety — so that there is no monotony.

This highly favourable set of environmental conditions should provide us with a greater individuality in our gardens, instead of having the very formal lawns bordered by annuals, which are so common. True, there is a gay display of colour, but the opportunity for something strikingly different — something unique — does exist. Calendar gardens, with a good display for every month of the year, are a possibility. Shrubs, for flowers, berries or foliage, provide a great scope for originality,

A landscaped layout
from "Complete New
Zealand Gardener,"
published by Whit-
combe & Tombs Ltd.



Planned Gardens . . .

by THEO H. BRUNN (Associated Nurseries Pty. Ltd.)

MAKING a garden without a plan is wasteful in energy, time and money, and the finished job generally shows clearly the lack of initial planning.

Whether you plan the garden yourself or have someone to help you—whether that someone is amateur or professional—there are certain details that you, the garden owner, must supply.

PLANNED GARDENS

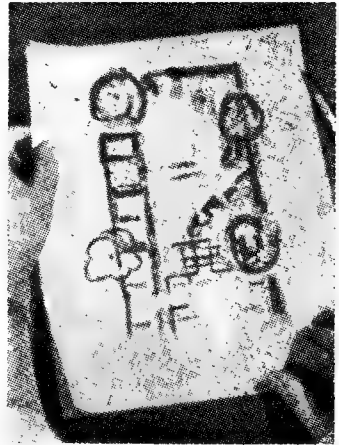
As a garden planner, I naturally have my personal likes and dislikes, and I have to be very careful, otherwise all the gardens with which I am associated will tend to look something alike. To overcome this, I endeavour to find out from the owners what are their personal preferences.

Do they like a formal garden or a wild type of garden? Do they want to plan a garden with a minimum of upkeep, so that golf can be played at the week-ends? Or do they wish to make their garden their hobby and enjoy the growing of flowers by their own personal effort? Have they any particular flower that they are very keen on — such as roses, irises, cacti? Do they want a utility garden in which fruit, vegetables and cut flowers are included, as well as garden show? Do they want to grow any particular types of flowers for show purposes? The owner of the garden must decide these points before planning can be started.



A terraced garden enables easy, eye-level enjoyment of your blooms. Here a circular lawn is surrounded by stabilised soil mixed with oil, cement or asphalt. For heavily travelled areas two gallons of oil per square yard makes for easy maintenance.

PLANNING APPROACH



Then the type of house, district, size of the block, slope of the ground, and kind of soil will have to be considered in conjunction with the other factors.

Planning on Paper

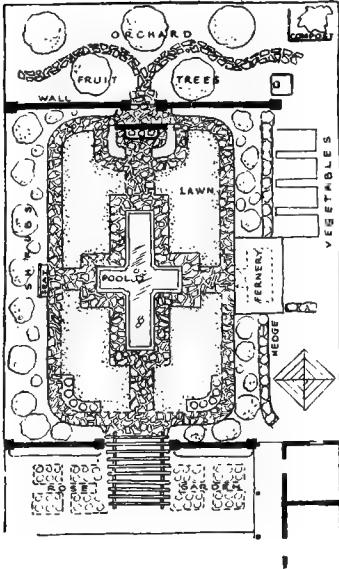
The first step of the planner is to commit the area to paper in the form of a scale plan. The simplest method is to purchase some graph paper large enough for a scale drawing of the whole block, using the scale of one inch to ten feet, then each little square on the graph paper equals one square foot. This makes the job easy, and you can quickly obtain a mental picture of the area to be taken up by each feature and each shrub or tree.

Next put on your plan the outline of the house, and all permanent fixtures such as outbuildings, garage, clothes hoist, etc. Fix a site for the incinerator and compost heap. Mark in the necessary paths. Divide off the area required for vegetables and other utility purposes, and the remainder is available for treatment with lawns, beds and special features.

The subject of garden planning can fill a large volume, so in this limited space we can only hope to give you some helpful hints, so that, having made up your mind what you want, you will be able to produce a practical plan.

Every day we see many lovely plans, beautifully drawn, but when they are carried out on the ground it is very often found that they are not practical.

PLANNED GARDENS



Do not try to put too many special features, such as pools, rockeries, etc., into a small area. Do not cut into your lawn with too many beds and specimen trees. It makes it look small and it is more difficult to cut—also lawns do not like too much shade, especially in the winter. Pools likewise require sunlight if aquatic plants, fish, etc., are to thrive. Narrow grass verges are wasteful of labour in cutting and trimming edges—better have a paved edging or a band of some good perennial border plant, such as ajuga or pinks.

Small areas can best be treated as English cottage gardens without lawns, or as semi-courtyards, using paving or gravel in place of grass.

Keep Beds Level

Always have the beds in the immediate front of the house built up so that they are level. Nothing looks worse than a bed sloping across the front of a house, or a front fence built on the slope of the land instead of keeping to horizontal lines, and stepping up in panels (see attached sketch).

Be careful to use only straight lines or long flowing curves for paths and borders—avoid a sinuous or wavy line. The best way to set out a curve is to lay the garden hose out and arrange this until you get the best effect, and then mark the curve on the ground.

Generally speaking, place paths and stepping stones in the natural direction for walking from one given place to another.

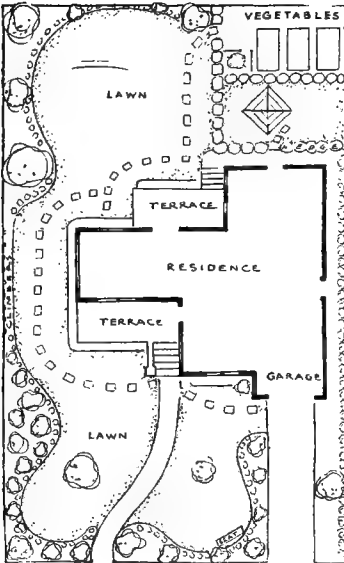
From inside the house, decide what view you want to retain, and what you want to hide, and on your plan trace a view arc from the windows, so that your planting will fit in with what is needed.

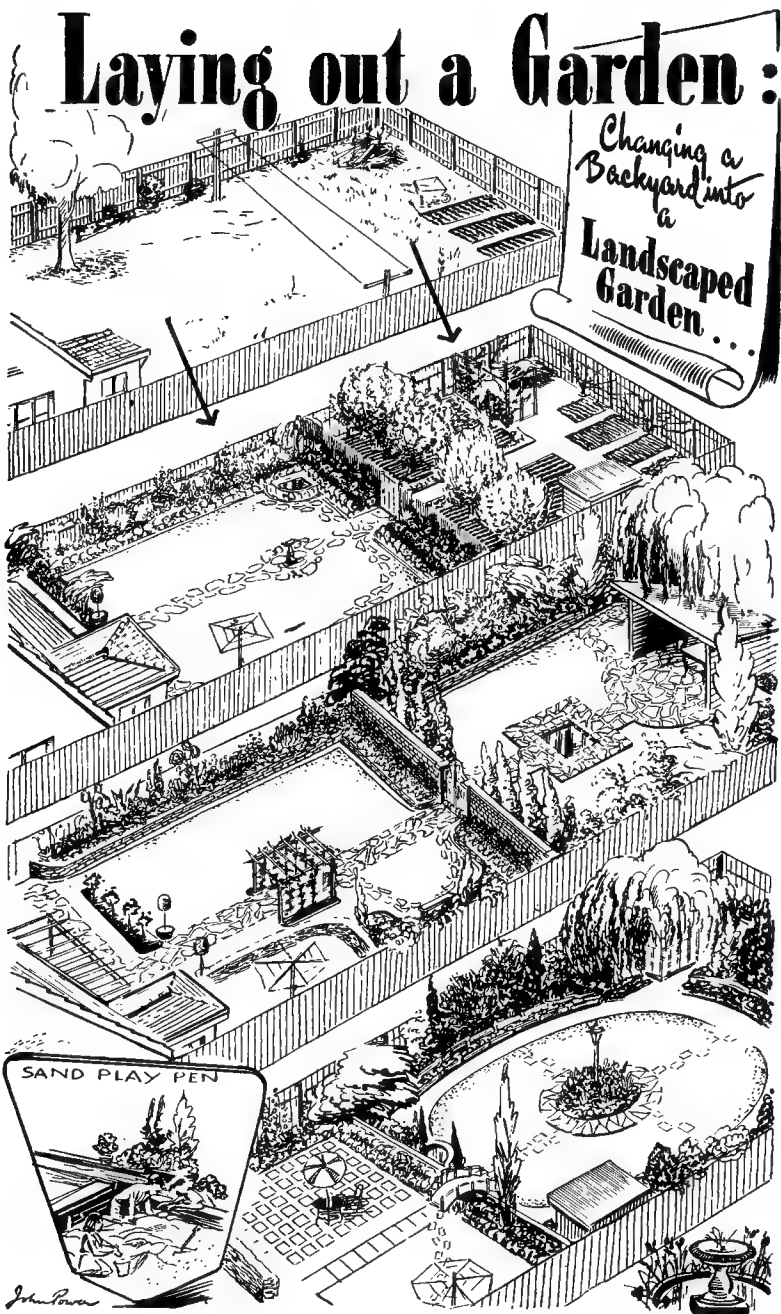
Don't forget that the drainage system and watering system and taps must be included in your garden plan.

Tips You'll Appreciate

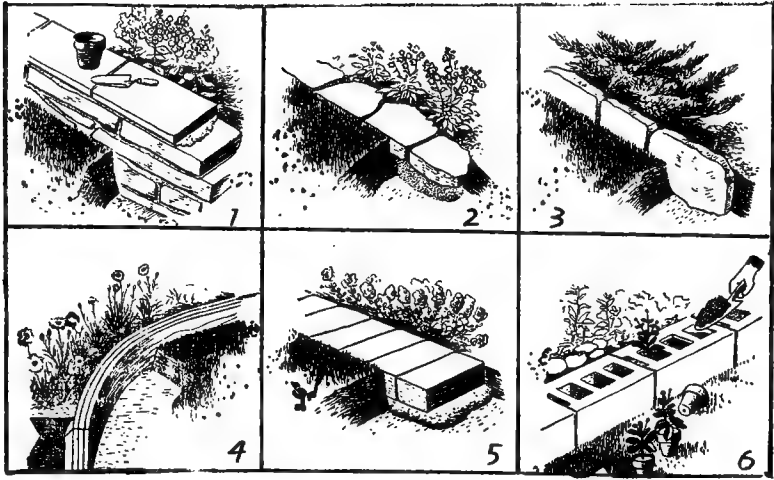
A rock-pocketed bank is generally better than a steep grass slope. The latter is hard to cut and keep watered, while the former provides a home for many floral gems otherwise difficult to place in the garden beds.

Formal hedges require a lot of cutting and attention, and are generally less beautiful than a line of good foliage and shrubs. Shrubs are usually better to hide a fence than creepers—the latter always want to go up to the top and leave the actual fence uncovered.





PLANNED GARDENS



A four-inch concrete cutting strip around the edge of lawns saves a lot of hand cutting, as it enables you to run the mower close to the edge of the grass, and a wheel cutter quickly trims the edges.

Our climatic conditions, hot in the summer and cold in the winter, call for a large percentage of deciduous trees and shrubs in the garden. They give shade in the hot weather, and allow the maximum of light in during the cold winter months. Not less than 50% should be used in any garden layout.

Remember that all shady beds are ideal for acid-loving plants, so be careful not to

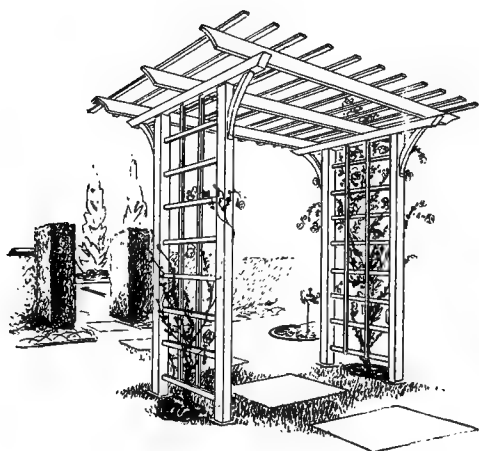
Six approaches to suitable edgings which enable permanent boundaries to be set for each bed. If the stonework is to be raised above the lawn level it would be well to set a 4-inch width of bricks or concrete along the lawn's edge so that the mower can keep the grass flush to your bed.

use any lime in these areas. Dig in some leaf mould, and old tan bark, and such plants as camellias, rhododendrons, azaleas, etc., will thrive.

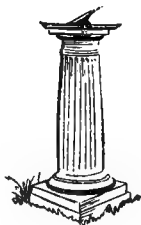
Most trees and shrubs only flower for a few weeks of the year, so foliage is more important than flowers. Use variegated, purple, golden and different-shaped foliage to give your effect, as well as flowers.

Except in the formal garden, do not try to have each tree and shrub placed with exactness, nor try to clip or train each to shape. A tree with a crooked trunk or even two leaders is to be encouraged. Let them intermingle in places to give a more natural setting for the informal garden.

Try to arrange a succession of flowers from your permanent features, such as trees, shrubs and perennials, so that you will always have something of interest in your garden.



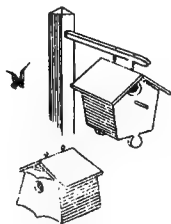
Pergolas are a pleasant adjunct, particularly in the summer garden, where their trellised sides afford help for climbers and roses and give a finishing touch to what would be a straggly garden.



Sun dials never fail to fascinate, and bronze plaques are available from leading stores that enable you to fabricate one from existing building materials in harmony with your home.



A bird bath makes a garden alive and lifts the low contours of lawns. Fish ponds are risky in Australian gardens, as they attract kingfishers and other fish-eating birds, and we have heard of many ponds that have claimed little children.



A quaint garden decoration with an old world touch are colourful birdhouses suspended from tree stumps or perhaps a lamp post.

Garden Furnishings



The garden well is a never-ending delight. In Australian gardens still water breeds mosquitoes, and we suggest that the well design takes the form of a bird bath, with a handy bucket which could be used for so many odd jobs around the garden.



A unique decoration can be made by fitting brackets to hold pot plants to a side wall and linking them up with a wire support to train a creeper in a decorative design.

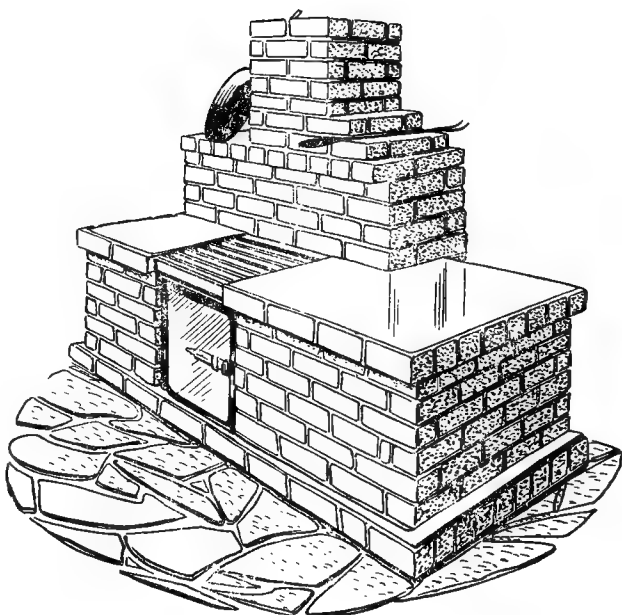
A BARBECUE

For your Garden

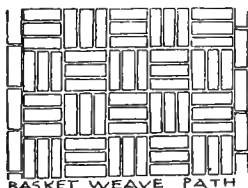
A party in the garden on a mild evening is more of a treat if you have a barbecue or outdoor kitchen. You may even be able to construct one which will dispose of much garden refuse. They look quite at home in a three-sided trellis shelter.



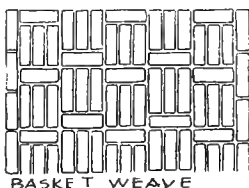
A path can be a permanent and a pretty thing, and patches of path-like stepping stones across a lawn give a garden grace.



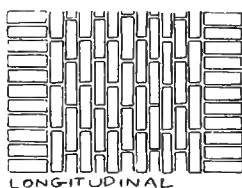
TYPES OF GARDEN PATHS



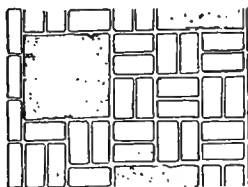
BASKET WEAVE PATH



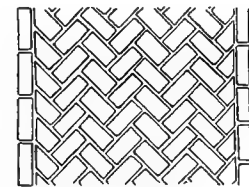
BASKET WEAVE



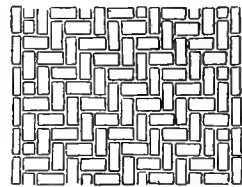
LONGITUDINAL



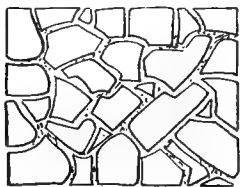
STONE & BRICK FLATS



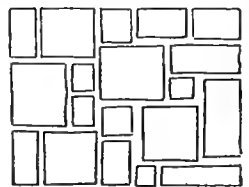
HERRING BONE



HEADER & STRETCHER



CRAZY PAVING



RECTANGULAR BLOCKS



FLAGSTONE

A Selected List...

A FLOWERING TIME-TABLE

Below you will find a flowering timetable of various trees and shrubs, showing their usual flowering period in Melbourne. Some have berries, some foliage, as well as flowers, and the time of display will vary in the different States, as well as in different parts of each State. In addition, early or late seasons will cause considerable variation in time, but this table will give a useful guide for flower planning.

SPRING

Acacia, Aesculus, Andromeda, Azalea, Flowering Apple, Flowering Almond, Baeckia, Berberis, Buddleia, Calycanthus, Camellia, Cantua, Chorizema, Ceanothus, Cornus, Corylus (foliage), Cytisus, Daboecia, Deutzia, Dimorphotheca, Diosma, Eriostemon, Feijoa, Felicia, Forsythia, Flowering Fruits, Gardenia florida, Genista, Geraldton Wax Plant, Goldfussia, Grevillea rosmarinifolia, Flowering Hawthorn, Indigofera, Kalmia, Kerria, Kolkwitzia, Laburnum, Leptospermum, Lilac, Magnolia (Japanese varieties), Maple (foliage), Melaleuca, Othonna, Paulownia, Pelargonium, Flowering Peach, Philadelphus, Flowering Plum, Podalyria, Polygala, Prostanthera, Prunus, Psoralea, Raphiolepis, Rhododendron, Ribes, Robinia, Sambucus, Sophora, Spiraea, Swainsonia, Symphoricarpos, Tamarix, Thryptomene, Viburnum, Weigela, Westringia.

SUMMER

Abelia, Brachychiton, Buddleia, Callistemon, Calodendron, Ceratopetalum, Ceratostigma, Cistus, Crotalaria, Duranta, Erythrina, Eucalyptus ficifolia, Fugosia, Gardenia Thunbergii, Grevillea robusta, Hakea, Heliotrope, Hibiscus, Hydrangea, Hypericum, Impatiens, Jacaranda, Justicia, Lantana, Lavender vera, Leonotis, Leycesteria, Magnolia fuscata, Magnolia grandiflora, Metrosideros, Nierembergia, Ochna, Oleander, Plumbago, Poinciana, Pomegranate, Rosemary, Spartium, Strelitzia, Virgilia.

AUTUMN

Arbutus (fruit), Berberis atropurpurea (foliage), Bouvardia, Caryopteris, Cotton-easter (berries), Crab Apple (fruit), Crataegus (berries), Lagerstroemia, Lasiandra grandiflora, Liquidambar (foliage), Maple (foliage), Plectranthus, Protea, Rhus (foliage), Sesbania, Stenocarpus.

WINTER

Acacia Baileyana, Acacia podalyriaefolia, Flowering Apricot, Bononia, Brachysema, Camellia sasanqua, Cassia, Cydonia, Daphne, Erica melanthera, Flowering Apricot, Flowering Quince, Garra, Gordonia, Lavender stoechas, Rose (Lorraine Lee), Leptospermum, Ruby D, Lambethii, and Walkerii.

ALL THE YEAR ROUND

Ageratum, Abutilon, Agathaea, Bauera, Cestrum, Choisya, Cuphea, Diplacus, Erica, Escallonia, Euonymus (foliage), Fuchsia, Lantana sellowiana, Lasiandra macrantha, Laurestinus, Photinia (foliage), Veronica.

ORDER OF SPRING FLOWERING TREES

These start in June and finish in November, their blooms appearing in the following order:—

Prunus mume (Flowering Apricot), Cydonia (Flowering Quince), Prunus bleireiana (Flowering Plum), Prunus Moserii (Flowering Plum), Prunus pissardii nigra and Prunus pissardii nigra Festerii (Red-leafed Flowering Plums), Prunus pollardii (Flowering Almond), Ribes (Flowering Currant), Pyrus malus Eleyii, purpurea, spectabilis, Parkmanii, Gorgeous (Flowering Apples), Prunus persica (Flowering Peach), Prunus serrulata (Flowering Cherry), Crataegus oxyantha (Flowering Hawthorn), Pyrus angustifolia, and Pyrus loensis (Flowering Apples).

In conclusion, I am so often asked "What do you consider the best trees and shrubs?" that I will try to give you my ideas, as follows:—

For Sheltered Positions:

Small shrubs: Azaleas, Kalmias, Andromedas, Daphnes, Paeonies.

Medium to tall shrubs: Rhododendrons, Camellias, Viburnums.

Small trees: Maples, Laburnum, Magnolias, Cornus.

For Open and Exposed Positions:

Small shrubs: Felicia, Ericas, Abelias, Cistus, Polyantha roses.

Medium to tall shrubs: Cotoneaster, Pyracantha, Retinospora Crippsii, Rhus, Hibiscus, Bush roses, Leptospermum Lambethii.

Small trees: Flowering Apples, Plums, Cherries, Almonds, Crepe Myrtles, Judas Tree, Acer negundo variegata. Specimen trees: Silver Birch, Liquidambar, Tulip Tree, Weeping Golden Cypress, Scarlet Oak.

Know your Soil...

CULTIVATION cannot succeed without skilful soil conservation; i.e. without constant improvement of its physical properties and fertility. Soil took hundreds of years to form. It can be destroyed in a few years.

Soil Profile

Soils differ because they have different histories, but a cross section usually shows two layers. The surface layer—or top-soil—is usually up to 12 in. deep and of deeper colour due to organic matter in it. The lower layer—the sub-soil—is paler and of different quality.

The top soil is the region cultivated for most plants, but roots of many plants penetrate into the sub-soil.

Constituents of Soil

There are three essential ingredients:—

SAND: Insoluble mineral particles ranging in diameter from coarse gravel (2 mm. or more) to fine sand (.02 mm.) and fine silt (.002 mm.).

Water and solutions pass readily through sand particles and are lost to roots in the upper layers.

There is always a thin film of water on the surface of sand particles, but this film alone is insufficient to maintain requirements.

CLAY: Particles of clay can only be seen microscopically. They readily absorb water, cohering together and becoming sticky and plastic. On drying, clay shrinks, causing cracks and setting to a hard mass.

Water cannot pass through a mass of damp clay, and a clay sub-soil may cause waterlogging of the top-soil. Clay contains many of the minerals essential to plants, and readily absorbs and retains the elements of fertilizers.

ORGANIC MATTER: Is the dead plant, animal, and bacterial matter in the soil. It is finally decomposed by living bacteria into a stable complex substance called ligno-protein, which is insoluble in water. This process may take years to complete.

The quantity varies from soil to soil. In nature it is being constantly renewed, but cultivation destroys it.

When thoroughly decomposed it is important because:

It acts as a soil cement, binding the soil particles together into crumbs and granules. Crumb structure is the measure of good physical condition.

It absorbs and retains very large quantities of water.

It retains useful minerals, and readily gives them up to plant roots.

It produces carbonic acid, which assists in the dissolving of the essential minerals.

It can make clay soils workable if present in sufficient quantity.

HUMUS is organic matter not yet fully decomposed into stable ligno-protein.

Kinds of Soils

Soils are best described according to their texture. This is the feel of the soil when crushed fine by rubbing between fingers, thumb and palm, moistening till wet but not till sticky.

Textures range from sand, sandy loam, loam, silty loam, clay loam, sandy clay loam, and clay to sandy clay.

The first four are light soils, easily worked. The last four are heavy soils, difficult to work.

Light and heavy does not refer to weight; a bucket of sand is heavier than a bucket of clay.

Soils with a preponderance of organic matter are often called peaty soils.

Colour of Soils

Colour is not a good guide to physical condition and fertility. Dark colour does not necessarily indicate fertility.

Organic matter produces black and dark grey colour in acid and neutral soils; it causes less intense colourisation in acid soils.

Reds and browns are due to iron staining, but this iron may not necessarily be in a form useful to plants.

USES OF LIME

Red soils may, however, indicate well drained conditions, and they frequently have a good crumbly and permeable structure. Yellows are due to iron also.

What is a Good Soil?

The ideal soil is a good balance of sand, clay and organic matter—a loam. A loam has good granular and crumb structure. Such a soil would be:

Easily worked (friable) and easily penetrable by large and small roots.

Well aerated, allowing gases to circulate throughout it and be exchanged with the atmosphere.

Easily drained of excess water which may fill air spaces between and within the crumbs.

Hold sufficient moisture in dry weather to prevent complete wilting and to dissolve soil minerals.

Supplied with all essential minerals and be able to retain artificial fertilizers for the necessary growing period.

Soil Improvement

Restoring "worked-out" soils and converting difficult virgin ones requires time

and consistent effort. In all cases aim for a loam-like type, by digging, draining, fallowing, liming, and, where necessary, by organic enrichment and fertilizing.

LIGHT TEXTURED SOILS cannot retain fertilizers for long periods in useful quantities. Instead, apply lightly and more often. Heavy soils retain all the important chemicals well enough for a single initial application.

HEAVY AND CLAY SOILS: Add organic matter in all forms copiously—dig in and trench compost and animal manure, followed by green manures. Break up the sub-soil and add ashes. Apply lime according to the acidity. In small plots mix in sand and loam.

SANDY SOILS: Add organic matter copiously, in all possible forms, over a long period. Remember that hot and dry sand destroys organic matter, and lime accelerates its decomposition. Apply lime sparingly, and use the carbonate forms to avoid mineral deficiencies.

In small plots, try mixing in loam and clay. If compost alone is used, complete fertilizer and trace elements should be added.

Lime is essential . . .

- It reduces the various harmful effects of excess soil acids.
- It supplies essential calcium. Dolomite supplies both calcium and magnesium.
- It stimulates the bacterial decomposition of organic matter, thus releasing more essential elements, especially nitrogen.
- It improves soil aeration and drainage. Latest evidence shows that it does not bind loose soils or loosen clays nearly to the extent once believed.

Forms of Lime

There are four forms available. Three are used:

Calcium oxide—burnt lime, stone lime, quicklime.

★ Calcium Hydroxide—slaked lime.

★ Calcium carbonate—ground limestone.

★ Calcium and magnesium carbonate—dolomite

Applying Lime

WHICH FORM? Slaked lime quickly reduces acidity; but on sandy and light-textured soils it can react with the soil to deny the plant certain vital minerals, causing deficiency diseases. For safety, use only the carbonate forms on these soils.

The hydroxide form is safe on heavy soils.

ORGANIC MATTER

How MUCH? Depends on the degree of acidity of the soil and whether virgin or recently used soil. Soil acid testing kits can give a workable indication; accurate determination can be made from tests of samples sent for analysis.

Dolomite and carbonate lime are used at the same rate. For the first dose on unlimed soils: Sandy, 1 to 1½ lb. per square yard; heavy, 1½ to 2 lb. per square yard. Slaked lime, on heavy soils only, 1 lb. per square yard.

How OFTEN? The first anti-acid doses will suffice up to five years. Later doses, to replace yearly losses, one-fifth of these amounts; the quantity contained in compost, applied regularly, would suffice.

WHEN? At time of preparation of the bed. Very finely ground (flour) lime, thoroughly mixed with moist soil, reacts quickly. Planting can occur after 48 hours. In this case, and providing no close contact with seeds or roots occurs with fertilizer, the whole operation of liming, fer-

tilizing and planting can occur on the same day.

APPLICATION: Spread or sprinkle on the surface and work into the top 6 inches.

MIXING WITH FERTILIZERS: Lime can be mixed with artificials and animal manures, but only in the carbonate form, and only if the mixture is dug in immediately. Usually these operations are separate. Hydroxide lime must be applied separately, before the fertilizer.

Over-liming

Excess lime retards growth, particularly of lime sensitive crops. It also reacts chemically with the soil to cause mineral deficiencies of many kinds. This is especially so with strongly alkaline stone and slaked lime in light soils.

Small quantities of superphosphate or copious applications of organic matter of all kinds reduce the effects of excess in lime.

Organic Matter . . .

MAINTEINING the organic content of the soil is vital. Cultivation easily destroys it and without it soil is useless. Too much organic matter can produce an acid and peaty soil. Exclusive use of it as a fertilizer may lead to deficiency diseases.

There are three ways of replenishing it:

- ★ Animal manuring.
- ★ Green manuring
- ★ Composting.

Animal Manures

Animal manures are unbalanced as fertilizers, and may produce unbalanced growth—too much vegetation and too little flower or fruit. In this case, supplement it with a superphosphate-potash mixture, 4:1.

Preferably apply fresh, but to bare soil,

a good time being the rough winter digging, since it tends to burn roots. Otherwise, apply later to plant beds well rotted, say, in spring.

To decompose before application, form into heaps, protected from the weather and from wasteful drainage. If it contains straw, stack loosely in low heaps to

ORGANIC MATTER

ensure aeration and faster decomposition. Try to collect and retain the urine, which is rich in minerals.

The most valuable forms are pig and poultry manure. Never exceed $1\frac{1}{2}$ lb. of these per square yard fresh. The poorest forms of any kind contain much straw and fibrous matter.

They are increasingly difficult to obtain. Conserve supplies by applying directly below the sowing drills, or in holes for individual plants.

LIQUID ANIMAL MANURE: Made by soaking fresh solid animal manure in water, 1 kerosene tinful in 10 gallons of water. Leave a week. Dilute the liquid, 1 part with 3 of water. The same solid can be used twice more, but the final liquid is not diluted.

The liquid is excellent as a nitrogenous side dressing for forcing established leaf crops, 5 gallons every 20 ft., weekly. Do not apply to dry soil.

Green Manuring

In the absence of animal manure in large quantities, use crops of legumes and cereals, dug in when immature or at early flowering. Time the digging-in so that the crop decomposes and releases its nutrients to the new crop before these are lost.

Legumes are preferable, since they leave the soil enriched in nitrogen, formed in their own root nodules. In good conditions, legumes decompose in two weeks. Hence, sowing the next crop can follow digging-in immediately, the nutrients being ready on completion of germination.

Cereal crops may temporarily deplete the soil of nitrogen while decomposition is proceeding.

USEFUL CROPS: Wheat, oats, rye and vetch mixtures. Blue lupins, field peas, tick beans, clover, alone or mixed with a cereal, $\frac{1}{2}$ lb. of seed per 8 square yards. For small gardens, sow green peas; dig-in after cropping. Apply superphosphate, 1 oz. per square yard.

Sow at any time which provides sufficient water and warmth. Idle plots in autumn and winter offer good opportunities. Chop up with a spade into short lengths and mix with soil thoroughly.

Compost

Is made in a pit or above ground, preferably enclosed in a special box. An ideal

container has walls 4 ft. by $3\frac{1}{2}$ ft. high, preferably of brick or treated solid wood, one being movable for transferring the contents.

IDEAL COMPOSTING MATERIALS: Succulent parts of plants, tea leaves, sea weed, woodash, fertilizers, trimmings. Do not use paper, cottons, wood or sawdust, hard stalks, oily leaves, fats, coal ash or disinfected matter.

Chop the material small and form a layer 6 in. thick. Moisten. Add lime or dolomite, 5 lb. per cwt. of material. Fork together well, but loosely. Sprinkle with superphosphate and sulphate of ammonia. Cover with 2 in. of garden soil. Always include some soil and, preferably, animal manure, in each layer.

Turn with a fork each month. Keep moist. Add further layers as material becomes available. Avoid wasteful seepage of rain by covering when necessary.

Heat hastens decomposition. In summer sufficient decay may occur in two months; in colder months decay may take up to six months.

Apply to the soil as animal manure. Spread thickly on the surface and dig in.

Leaf Mould

Leaves contain all the important minerals. They are also a valuable source of organic matter. Use them for mulching, composting and potting plants.

Prepare leaf mould in a pit or box, as for compost, layering the leaves with soil as they accumulate, adding sprinklings of lime and sulphate of ammonia. The final product should be considerably reduced in volume. Do not use lime if preparing for lime hating plants; use an extra sprinkling of sulphate of ammonia.

Keep damp. Decomposition in this way will take as long as compost. (See Compost.)

If time is no object, alternate layers of leaves and soil alone will suffice, but the decomposition time will take months. Keep damp.

Deciduous leaves are widely used for making potting soils (see pp. 173, 132), and they tend to produce an acid mould.

Evergreen eucalypts, because of their high oil content, take a very long time to decompose; do not add them to another leaf mould mixture until well decomposed.

Fertilizers...

FERTILIZERS are used to temporarily restore deficiencies in the soil's store of chemicals. They are not a substitute for the vital organic content of the soil. There are two kinds: inorganic mineral fertilizers and organic fertilizers. Both types are prepared industrially.

Repeated doses of these fertilizers may destroy both the organic matter, and with it the structure of the soil, so that the soil becomes "worked-out," and much poorer than at first.

Crop Needs Summarised

The plant takes up these minerals from the soil in decreasing order of quantities: Nitrogen, calcium (from lime), potash, magnesium (from dolomite), phosphorus, sulphur, chlorine, iron, and several trace elements.

Nitrogen, phosphorus and potash are the most commonly deficient.

NITROGEN is vital for the development of strong stems and healthy leaves—the plant's laboratory. Too little produces stunted growth and yellowish-redish leaves.

Too much produces excessive leaf and stem growth, smaller or no fruit, and a generally soft and sappy growth, susceptible to fungus and insect attack..

Leaf crops require more nitrogen than others.

PHOSPHORUS promotes root growth and seed development, ensuring earlier maturity of fruit. Lack of it means a poor root system and stunted growth.

Most Australian soils are phosphorus deficient.

POTASSIUM regulates the production of sugars in the leaf, and is thus basic to the plant's vigor.

TRACE ELEMENTS: Several elements are required in very small amounts: boron, molybdenum, copper, zinc, manganese. Their absence produces many kinds of deficiency diseases in fruit, vegetables, and field crops.

Nitrogen: Supplying Fertilizers

SULPHATE OF AMMONIA (21% nitrogen): Dissolves fairly readily; slightly slower in action than nitrate of soda. If used exclusively for a long time may turn soil acid; lime will be needed to correct this.

NITRATE OF SODA (16% nitrogen): Very soluble and produces results

in a few days. Often preferred in winter. Used for forcing established leafy crops. Heavy feeding flowers—zinnias and dahlias—and ornamentals profit from small but regular doses. Keep airtight or will become sticky.

Apply these two fertilizers in small doses only, not exceeding 2 oz. per square yard, either in solid or liquid form.

NITRATE OF POTASH (14% nitrogen).

DRIED BLOOD (12%), **BONE DUST** (5%), **BLOOD AND BONE** (6%), **CASTOR MEAL** (4.5%).

These are organic forms; bacteria take considerable time to decompose the nitrogen compounds in them into a form suitable for plants. Use for slow-growing crops, or well in advance. They are useless for immediate use as top dressings. Applied up to 1 lb. per square yard, they are favoured for potting soils, roses, and dressings for new lawns.

ORGANIC MATTER is generally rich in nitrogen, but varies greatly in composition. (See previous section.)

Phosphorus: Supplying Fertilizers.

SUPERPHOSPHATE ("SUPER.") (20% water-soluble phosphoric acid): Is not readily leached out. In time forms insoluble compounds, and fresh applications must be made.

Can be used in seed beds and permanent beds, alone or as part of complete fertilizer. In seed beds dust surface lightly and mix with soil well. For later dressings, dust and water in.

For general flower and vegetable use, use 2 to 4 oz. per square yard.

Avoid direct contact with seeds and roots.

FERTILIZERS

BONE DUST (22%), BLOOD AND BONE (15%), GUANO (20%), FISH FERTILIZER (5%), are organic forms. (See Nitrogen, above.)

Potassium: Supplying Fertilizers

CHLORIDE (or muriate) OF POTASH (50% potash). Fairly soluble, not readily leached out.

SULPHATE OF POTASH (49% potash).

Neither nitrogen nor potassium fertilizers function well without the other. Potassium is vital to protect the plant from an excess of nitrogen.

Potassium fertilizers are usually most needed on peaty and sandy soils; rarely on heavy and clay soils.

Up to $\frac{1}{2}$ lb. per square yard can be applied with safety.

Both potassium are required most importantly in the early stages of growth, since neither are readily leached out of the soil, their most economical application is in the preparatory seed or planting beds.

Seaweed

Contains useful amounts of potash, together with iodine and boron. Apply sparingly to soil because it contains insufficient nitrogen to help the bacteria decompose it, and may thus cause nitrogen starvation.

Wash the salt from it and chop into small pieces. Its best use is in the compost heap, or when well rotted. In this case is an excellent fertilizer. A layer, 4 in. thick and dug in, is ample.

Wood Ash

Contains potash, together with varying amounts of lime, phosphate, and magnesia. It is useless if washed by rain. Because of the lime content do not feed to acid lovers such as rhododendrons and azaleas.

It is best used in the compost heap. However, if applied to the soil, do so before planting, and do not mix with nitrogenous fertilizer before applying. A pound per square foot is safe.

Coal and coke ash has almost no value.

Trace Elements

The plant uses many essential minerals—the trace elements—in very small amounts. Prolonged cultivation, excessive

liming, especially with strongly alkaline lime on light soils, and fertilizing exclusively with organic manures causes their deficiency in the soil, and the corresponding deficiency diseases.

A good supplementary trace element dose to augment, say, 10 lb. of main fertilizer, applied at $\frac{1}{2}$ lb. per square yard, would be: Manganese sulphate 3 oz.; copper sulphate $1\frac{1}{2}$ oz.; zinc sulphate $1\frac{1}{2}$ oz.; borax 1 oz.; sodium molybdate $\frac{1}{2}$ oz.

Zinc, manganese and copper is more effectively sprayed on to foliage rather than if fed to roots. For 100 gallons of spray: 4 lb. zinc sulphate, 4 lb. copper sulphate, 6 lb. manganous sulphate, dissolved in most of the water. Make an even suspension of slaked lime in the remainder. Now stir the solution and suspension together. Mix $\frac{1}{2}$ gallon white oil with 2 gallons water. Add to the other mixture, stir well and apply.

Placement of Fertilizers

BROADCASTING: Spread on surface of bed, manure or compost cover, and turn under to 4 in. deep, 4 oz. per square yard.

DRILL PLACING: Before placing the seed or seedlings, make a drill 6 in. wide, 4 in. deep. Place fertilizer in two bands along the two corners of the drill. Fill in and firm. Now place the seed in a permanent drill directly over the first, but avoiding direct contact with the fertilizer.

One or 2 oz. per lineal yard of drill, distributed between the two bands, is generally adequate for vegetables.

HOLE PLACING: Sprinkle on the bottom of a hole the required size. Fill in, firm and plant centrally. Or merely spread in a circle on the prepared surface and dig in.

SIDE DRESSINGS: To apply quick acting nitrogen fertilizers to growing leafy crops. Place on soil surface within the root area. Dig in lightly, without contacting the roots, or better, water into the soil. For most crops 1 to 2 oz. per square yard.

LIQUID DRESSINGS: For applying mostly nitrogen to established plants.

A good complete liquid fertiliser can be made of nitrate of potash and superphosphate in equal quantities.

In each case, 1 to 2 oz. per gallon, according to the plant requirements, per square yard. Or apply along the rows. Use a watering can without the sprinkler to avoid wetting the foliage.



Garden Maintenance

★ TOOLS

★ WEEDING

★ STAKING

★ CULTIVATION

★ FROST CONTROL

★ WATERING

The Tools for Everyday Gardening

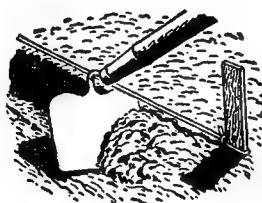
THE tools needed to keep the home garden in good order are neither extensive nor expensive and, provided they are well kept, should last a lifetime. When finished with, the tools should be cleaned of soil and dried if wet. It is a good idea to wipe them with an oily rag to prevent the steel parts rusting. Never leave them exposed to the weather.

Spade

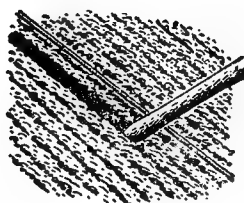
The most important gardening implement is the spade, and there are a number of long-handled varieties. The blade must be of good steel and able to stand the strain of digging without warping or bending. The length of the blade should be about

a foot and the width about seven inches. On the top of the blade should be a foot-rest to prevent it cutting into the boot sole when digging. Do not use your spade in a lever-like manner when digging, as the part where the wood joins the handle is a weak point.

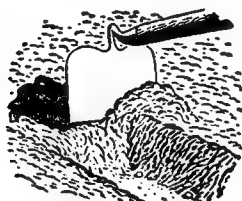
Gardening Tools...



For large seeds such as peas and beans, pull a corner of the hoe through the ground at the proper depth. Hold the hoe against the string as a guide. Be sure furrow is same depth for the entire length of row to equalise seed growth.

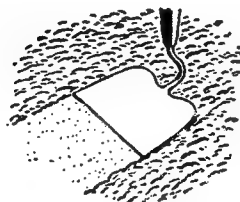


Make a shallow trench for small seeds like lettuce and carrots that require only a light covering of earth. Use the hoe handle and draw it through the soil, using the string as a guide. Consult seed package for proper depth.

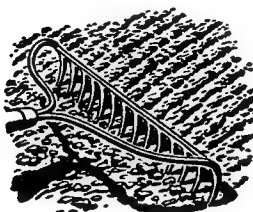


Cover the furrow by pulling an end of the hoe along the side of the furrow. Be sure the soil used to cover the seeds is finely pulverised.

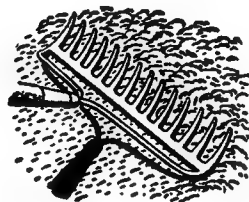
Don't cover too deep.



Pack down the soil over the furrows after the seeds have been covered. Use the back of the hoe or a board placed over the row. This excludes air pockets which cause poor germination. Also prevents seeds washing away in heavy rain.



Pulverise soil with the rake after all clods have been broken up. Work the soil to a depth of several inches. This is one of the most important steps in gardening. All heavy clods, stones and other debris should be removed before planting.



Level off the ground after the soil has been worked. The back of the rake can be used to push soil about to fill in holes or low spots. Try for as level an area as possible, otherwise water will stand in low spots, causing the seeds to rot.

GARDENING TOOLS

Garden Fork

There are two types of gardening forks, and both are excellent means of cultivation. The ordinary fork has square sectioned pointed tines and the potato fork flat square-ended tines. A fork is better for working manure into the soil than a spade.

Rake

The next most important article is the rake, and this should have a head of about 14 to 16 in. long, with teeth about 2 in. in length. The best length for the handle of the rake is about 6 ft., giving one good command of a large area.

Hoes

Many persons regard the hoe as an indispensable part of their gardening equipment. The Dutch hoe, with a flat blade set at a slight angle to the handle, which should be about 5 ft. in length, is the most popular. Care should be taken when weeding with a hoe not to chop into the roots of nearby plants.

Trowels

The hand trowel is a very useful and practical tool among the smaller implements. It is particularly handy for the lifting of small seedling from boxes for transplanting without damaging their roots or soil.

Hand Fork

Very useful when weeding in congested locations, the hand fork is, however, not indispensable.

Other Tools

A broken spade or fork can be made into a handy implement for making small holes in the soil when planting seedlings. The broad grip of the handle makes it comfortable to use. A table knife is a tool found in almost every garden, its uses being many and varied. Perhaps one of the best time-savers is a wheelbarrow, and it could be termed an essential. Next, a hose or hoses, and two or three buckets for carrying water and storing mulches. A few large drums are also good for this purpose.

Watering

A dibble is most useful, not only for making planting holes, but for making water wells to feed the roots.



WHEN: In general, flower gardens, lawns and vegetables are best watered in early morning and late evening.

Loosen the surface first, by hoeing carefully, and loosen again after watering when the surface has become compacted.

HOW MUCH WATER? Soft stemmed, actively growing, large surfaced leaves and generally sappy plants: These wilt quickly, but recover quickly. It is easy to recognize wilting.

Hard wooded shrubs, small leaved or dormant plants die readily if their tissues dry out too much. They generally require less water than others.

HOW: Overhead sprinkling distributes water over an area evenly. This may be a disadvantage where several different kinds of plants are growing. A good method involves evenly spaced nipple sprays (every 12-15 ft.) along an overhead pipe.

Furrow irrigation enables deep and thorough soaking over a long period. The hose can be used if the nozzle is shielded to prevent erosion.

Water thoroughly and regularly—not lightly and often. Otherwise the plant will develop a shallow root system, which will be killed or damaged by the hot sun.

CORRECT METHODS OF USE

**Keep back straight
use the bigger muscles**



Right



Wrong



Right



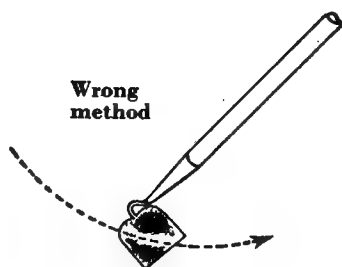
Wrong



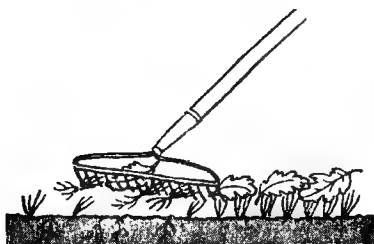
Wrong



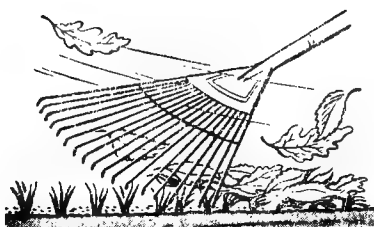
**Right
method**



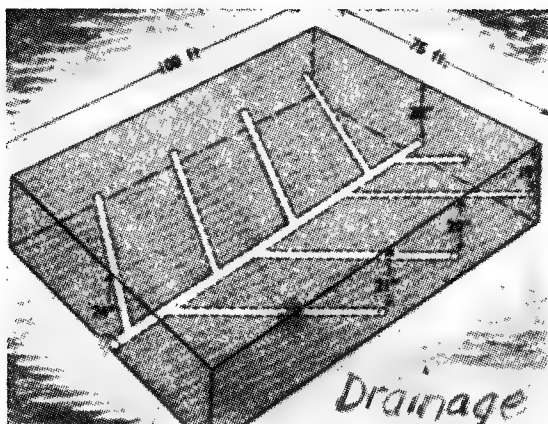
**Wrong
method**



**Garden rake is likely to
uproot lawns.**



**Lawn rake does not tear
up roots.**



Drainage

★

This pattern of a paddock shows a logical laying of agricultural pipes for good drainage.

Before we commence to make a garden, drainage should be considered. If you suspect that your garden may become waterlogged in winter, or is poorly drained, lay a series of agricultural pipes. These should not be less than 18 in. below the ground level at any point and should be laid at an inclination to carry away water. The pipes are not cemented together, and screenings or gravel is heaped over each join to enable the water to seep through without carrying away any garden soil.

It is best to work from the outlet or ditch to which the water is to be drained, so that a gradual inclination can be made from that point, usually at a slope of about 6 in. for 100 running ft. At the outlet the ditch may be 2 or 3 ft. deep. In heavy clay soils the placing of drains in a herringbone pattern similar to our illustration may be necessary.

Fallowing

Fallowing is beneficial for all soil, and especially vegetable soil. It is a period of rest for the soil, during which it recovers its physical chemical and bacteriological condition. Fallowing simply consists in digging the soil thoroughly at the end of a crop, and leaving in the rough until preparing for the next planting.

During the growing little or no fallowing may be possible. During autumn and early winter dig and lime and leave as long as possible.

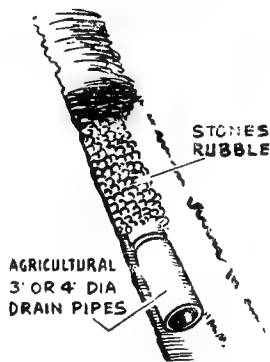
Tillage

Tillage is successful only when the soil is worked at the correct degree of moistness. It is most satisfactory when the soil is still moist after the excess has drained away, after rainfall or watering.

Don't dig when sodden, because the soil tends to cake hard on drying out.

Don't dig when dry, because the soil will become powdery with hard clods.

Agricultural pipes are not cemented together, but gravel or screenings are placed over joins to allow the water to filter into the pipes.



Turning and Working the Soil...

Loosening the soil improves the drainage, and the mixing of humus with it naturally brings fresh portions of the soil to the surface to be improved by compost and weathering.

Here is the correct way to turn a piece of ground with the spade. Drive a stake at each corner, fixing a string line from stake to stake. Mark along this by chopping a groove into the ground to define your area, dig a trench across one end of the plot and dump excavated soil at the other end, just outside the marked off area. Make the trench 1 ft. wide, or as deep as the blade of the spade. If your bed is weedy, scrape these off, scraping

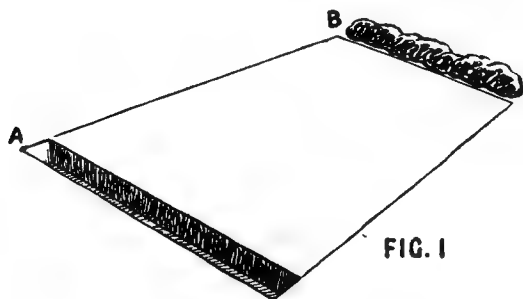


FIG. 1

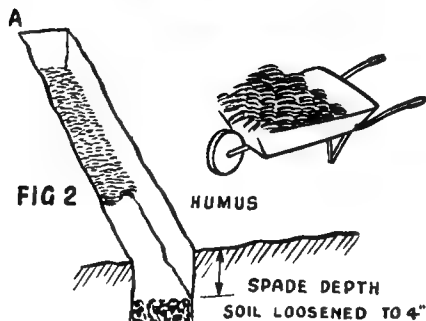


FIG 2

HUMUS

SPADE DEPTH
SOIL LOOSENED TO 4"

them off the edge of the trench about 9 in. and throwing them into the bottom of the trench which you are digging. Spread a layer of compost or manure into the trench, and you now have an area ready for spading adjoining the wall of the trench. This is turned into the trench you have dug, and gives you a working area continuously along the edge of the trench and the width of your bed.

Except on stony ground you can do better with a spade than with a fork.

It is recommended that you drive the spade almost vertically into the ground 6 in. or 7 in. back from the edge of the trench and as deeply as possible. Throw the soil well forward, turning it upside down so that the surface soil is underneath, repeating this process up and down your trench.

You complete trench after trench until you have come to your boundary line, when the last trench is filled with the soil from the first, which is already heaped handily by.

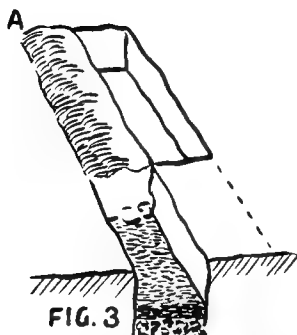


FIG. 3

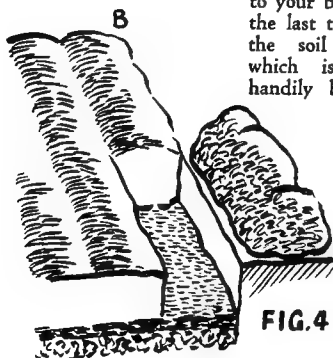


FIG. 4

Staking and Tying

Double digging is done in the same way, except that the trench is about 2 ft. wide and is as deep as the top soil or the spade blade. In double digging, manure or compost is spaded into the bottom of each trench, then another layer is spread along the bottom of the trench before the top soil from the next trench is turned on to it.

Once the garden has been well dug, subsequent diggings can be performed more quickly or with a fork. During these processes artificial manures or organic matter may be first applied to the surface and then dug in. (See our section on Fertilisers and Manures.)

Staking and Tying

Staking the taller varieties of plants should be done early and neatly. Be sure that you stake before the plant shows signs of requiring staking, for if left until the last minute it will become difficult; stems may become deformed, or sudden heavy rains may level the plants to the ground.

A single stake will be all that is necessary for a dahlia plant, the growths being looped singly to it as they extend upwards, whereas a chrysanthemum, or Michaelmas daisy clump, may need a triangle of three stakes suitably braced around it. Some plants can be successfully supported by three or four twiggly sticks, disposed around them without ties.

The support must be strong and suitable for the task involved, being of sufficient

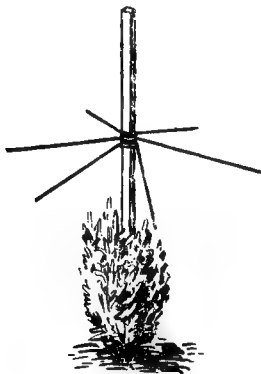
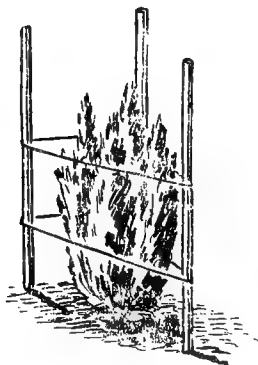
height to allow for the maximum growth of the plant. Try to arrange the stakes so that when the plant is fully grown they may be hidden by the latter's foliage. When the plant is fully grown it is a simple matter to trim the stakes to a required length.

With regard to the ties, they may be of string, raffia, or patent garden twine. Do not use fine wire or any material likely to chafe the plant. The quickest and safest way of tying is to twist the material first around the stake, then loop the ends around the stem or stems before knotting them. Bunching or strangling the plant must be avoided, allowing plenty of room for later growth or expansion.

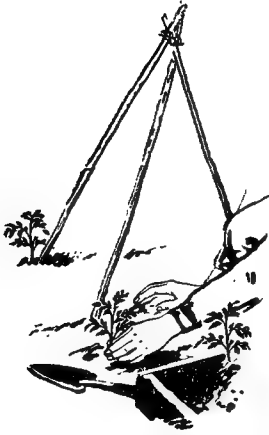
It is a good idea to attend to the tying of your plant two or three times each season, making higher ties as the plant progresses.

Staking

Unightly tall stakes often spoil a floral display. Therefore heavy gauge wire may be used. This may be ringed at the neck to hold single stalks on such flowers as tulips. A twist may be put in the wire so that tall stems of flowers like carnations may be intertwined through it and held upright. The wire may be affixed to the top of bamboo cane or other stakes, with a ring in the neck to hold tall flowers like lupins or delphiniums. Climbers can be trained if three tall stakes are driven into



VARIOUS METHODS



the ground and several tiers of wire affording support. It is best to grow the plants on the outside of such structures, so that when in bloom the supports will be concealed. Natural bush twigs which are somewhat forked make a rustic support for fragile tall flowers, but these stakes should only be about half the height of the plant so that they do not brush the blooms.

Never tie plants to a central stake like a sheaf of wheat, across the centre. It is best to inter-link the various stems of such plants and tie the central ones where the tie may be hidden.

Frames for Support

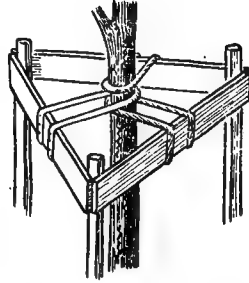
A useful effect for stopping flowers like carnations drooping on the ground is to stake an area of wire netting about 6 in. from the ground, allowing all blooms to appear above the support.

Removable frames of trellis of very wide mesh, and shaped so that they are decorative, can serve a dual purpose of support and decoration in a garden.

Frost Control

If during the winter months you, the gardener, are to be faced with the problem of protecting the plants from frosts, the two principal methods are mulching, or covering ground plants with straw, etc., and making hessian or brown paper covers to tie around larger plants.

The mulch should consist of any material that will give soil protection, such as coarse stable manures, straw, leaves, hay, or coarse material from the compost heap. These are placed directly on the soil over the plants



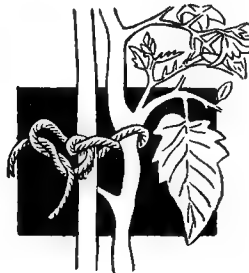
during the cold "snaps" to the depth of one inch for the fine materials and up to three inches for the coarser types. Ice must not be allowed to form on leaves and so blacken them, hence the value of glass frames.

Cloches

A simple means of frost control in the open garden is effected by means of portable cloches, which are frames shaped like a tent, made of either glass or hessian material. These are particularly useful for any seedlings which are susceptible to frost-bite.

Cold frames are the usual method of raising seedlings, as they can be made on more generous proportions. They are usually hinged with a glass top. Lean-to frames are useful, as they may be made hinged or portable, providing there is a fence or wall to which they may be affixed. Ventilation is an essential feature of a cold frame. Louvred windows would make an ideal cold frame lid.

In cold climates a cold pit is often constructed. This takes the place of a wooden frame, being of brickwork and inset into the ground about 1 ft. below the surface level, yet retaining a glassed-in roof.



Mulching . . .

Mulching is principally a method of keeping the soil surface in a highly favorable condition in the climatic extremes of drought and frost. In addition to the advantages listed below:—

Mulch protects the granular structure of the surface from the action of heavy raindrops and waterings, and prevents puddling, or compacting. Soil cannot absorb water so readily through compacted surfaces, and is more readily eroded.

Mulch keeps the fruit and foliage of surface plants and crops clean.

Some mulch materials become excellent composting additions when dug into the soil after the summer drought and winter frosts. Remember that nitrogen deficient material—straw, chaff, sawdust, hay depletes the soil of nitrogen. Such material, in quantity, must be dug in together with organic fertilizer.

Summer Mulches:

1.—Do not entirely prevent evaporation, but they reduce the water loss and conserve the supply, ensuring fertilizer and mineral solution even in dry weather.

2.—Greatly reduces weed growth. Large amounts of water are lost from the soil by evaporation from the leaves of weeds. Those weeds which do appear are weaker and more easily pulled out.

3.—Effectively lowers the surface temperature and protects the root hairs against desiccation.

Winter Mulches:

Tend to blanket the top soil from the low frost temperatures, which depress the activity of the roots and reduce solubility of the minerals and fertilizers.

Materials Used:

Old manure, rotted or partly decayed leaves, sieved sphagnum moss, old sawdust, compost, peat moss, hay, straw, lawn clippings. These are suitable for digging in. Others: Sheets of dark paper, cardboard, bags, and layers of newspapers pegged or weighted down.

APPLICATION: Loosen the surface carefully and place the material around the plants, at least 2 in. deep. Do not allow to compact tightly. Apply to dampened soil.

Mulching Without Mulch:

Moisture can be conserved to some extent in dry periods, without mulch, by shallow hoeing or deep raking. Keep weeds to a minimum.

Hormones . . .

The amount of hormones and chemicals present in a plant is extremely small. Detailed research within the last few years has been responsible for revealing the chemical identity of some of these substances. Being complex substances, they have complex chemical names. One of the growth hormones, indole acetic acid, can be prepared in the laboratory. Although this substance can be synthesised more readily than it can be concentrated from plant tissues, it is not cheap to prepare. Other related chemical substances which do not exist naturally in plants are very much cheaper and easier to prepare, and some of them are more potent than indole acetic acid (sometimes referred to as IAA). Fresh fowl manure is naturally very rich in IAA. The deleterious results of heavy applications of fresh fowl manure may be due to the IAA it contains. The

chief synthetic ones, with their abbreviations, are:—

Alpha-naphthalene acetic acid—NAA.

Beta-naphthoxy acetic acid—BNOA.

2, 4-dichlorophenoxyacetic acid—2, 4-D.

4-chloro-2-methyl-phenoxyacetic acid —
“Methoxone.”

2, 4, 5, trichlorophenoxyacetic acid—TCP.

Ethylene chlorhydrin—ECH.

These substances have many uses in horticulture and can cause stimulation or retardation of growth, like IAA, depending on circumstances and on the concentrations at which they are used. They are so potent that their concentrations are usually given in parts per million. Thus one ounce of a substance, dissolved in 100,000 ounces, or 625 gallons, of water would give a concentration of 10 parts per million (10 p.p.m.).

WEED CONTROL

it may be used for the lower-growing plants. Oat straw is softer and will make a better mulch than wheat or rye.

Hay: Cured hays are very good for mulching material. It is often possible to buy spoiled hay, unfit as food for animals, but still excellent for a mulch. The advantage of such material is that, when it becomes moist, it begins to break down, and by the end of the season will be practically used up. It furnishes an abundance of nutrient material to the growing plant. Clover has a large amount of protein in it.

As the mulch breaks down the protein disintegrates and the freed ammonia seeps into the soil to serve as food for bacteria which are responsible for changing it over to nitrate nitrogen, a valuable nutrient for plants. Grass hays are good for mulches, but are more resistant to decomposition. They will last longer because they contain less nitrogen, but will add more organic matter to the soil. The one objection to hay is the fact that it is often cut so late that any weeds which may be present will have gone to seed. These, of course, will infest the ground.

Weed Control

Weeding

It is not necessary to dig deeper than $\frac{1}{2}$ in. to $\frac{3}{4}$ in. around the base of each plant to keep down the weeds. Do all ploughing and harrowing at an earlier date. Weed killing can be accomplished most easily when they are small. A garden rake, garden hoe, or a wheeled hoe or cultivator are the best for the thicker growths, and the small hand tools such as hand forks and knives for the close work. The main point to remember is to uproot the weeds and then turn the soil over, making sure that no roots are left behind to flourish again. The cultivated plants then have a better chance free of the weed competition for the plant food, moisture and vital sunlight.

Control and Destruction

No matter how thoroughly cultural operations are performed or how careful the grower is to eliminate sources of contamination, seeding, and carry-over, or how effectively his rotations and fallows are manipulated, weeds of one variety or another provide a full-time problem from season to season. Nevertheless, care in respect of these points forms the basis of weed control, and if effectively carried out it will do much to stabilise the position and bring it within economic limits.

CIRCUMVENTION: Before discussing direct methods by which weeds may be controlled and destroyed in crops, it is obvious that if the crop can be started off on clean soil the outlook for that crop, and incidentally the grower himself, is immeasurably

better. For crops with slow germinating seed, or plants that are particularly weak in the early stages, or where extensive cultivation is not possible, it is best to choose this type. In general terms, the following areas might be relied on:—

- (1) Pasture free from serious perennial weeds and pests, ploughed up and worked in late autumn after normal seed dissemination has ceased.
- (2) Land fallowed and worked from February onwards.
- (3) Well cultivated land from which a good cleaning crop, e.g., cabbage or cauliflowers, has been taken.

Amongst the areas which often require special treatment before sowing or planting can be considered are those from which vegetable seed crops have been taken, or where twitch, thistles, wireweed, sorrell, and such quick growers as spurrey, speedwell and chickweed have found growing conditions favourable to their development in late summer and autumn.

The *Tasmanian Bulletin on Vegetable Culture* gives the following:—

The old adage that "no matter what the weather, a hoeing is better than no hoeing" should be constantly borne in mind. With all crops, careful and constant movement of the soil in between the rows not only keeps the weeds in check but aerates the soil and increases the availability of plant foods; the depth and extent of this cultivation will be governed largely by the stage of development and rooting habits of the growing crop, distance apart, and so on, more latitude being possible with vigorous

WEED CONTROL

growing and tap-rooted types than with those that are tender and shallow-rooting.

The golden rule in weed control is first to get them early (when they are small and easily killed), and secondly, to get them often (particularly if they are of a persistently vigorous or perennial nature). Even the most insidious weeds can be eventually reduced to negligible proportions by frequent and regular hoeing. For annual types during the cooler parts of the year, the hoe should be manipulated to bury rather than undercut; in the summer, however, undercutting without burying is, of course, quite effective. Where weeds get ahead during wet and cool periods, shallow (semi-horizontal) digging is particularly good for some crops and is often the only means by which the situation can be retrieved.

There are, of course, some weeds which require special treatment. Twitch, for instance, onion twitch, and some of the bulbous types will require to be dragged out and dried off by frequent cultivation, or may come more quickly under control if removed by hand so far as is possible in the preliminary stages and burnt. White weed and "Californian" thistle where present in isolated patches will also repay removal by hand, as the spread during cultural work is often rapid and can thus be prevented.

SPRAYING TREATMENT: In recent years rapid strides have been made in the control of weeds by the application of special sprays which prove deadly when applied to certain weeds, but leave the crop involved practically undamaged. These sprays are known broadly as "selective" sprays, though their effectiveness may depend upon widely different conditions or circumstances. With some it is the retention of the spray material by flat or hairy and rough leaves which produces the scorching and death of the plant. With others the precise causes of susceptibility or immunity to damage is more obscure. Rapid progress in the use of special selective sprays for weedicidal purposes is being made at the present time, and at least three types can now be recommended, though it is possible that great advances will be made in the near future both in the number and type of suitable combinations:—

- (a) *Oil Sprays:* A specially prepared spray somewhat similar to power kerosene is now widely used in some countries for control of weeds in

young carrots, and to a lesser degree parsnips. Supplies at present are somewhat uncertain here and straight out power kerosene is, therefore, utilised; however, as the quantity of sulphonatable oils (the main consideration in these sprays) varies in different bulk lots, it can only be ascertained by trial whether the spray is suitably balanced or will kill carrots and weeds alike. Try, therefore, a small strip before embarking on any wholesale applications. The quantity of oil required per acre will approximate 50 gallons, and it is absolutely essential that the seedling carrots be sprayed between the three to four leaf stage only, otherwise serious injury may be experienced.

- (b) Sodium di-nitro-ortho-cresyllate, sold under such trade names as "Sinor" and "Dinoc." Suitable as a selective spray for the control of weeds with rough, flat or hairy leaves, in onions and, to a lesser degree, green peas. In certain cases the incorporation of 1 lb. of sulphate of ammonia as an activator is recommended.
- (c) 2-4 Dichloro-phenoxy-acetic acid — (2-4D), also sold under such trade names as "Weedone," and 4 chloro 2 methyl-phenoxy-acetic acid — (M.C.P.), also sold under trade names such as "Methoxone," are now undergoing exhaustive tests with the object of determining their use in horticultural work. These have a slower effect, but produce good results when conditions are favourable.
- (d) For general weed control on paths and on areas where blackberries, bracken, broom, firewood, and other types become troublesome, one of the commercial arsenic preparations used as per recommendation can be utilised, being either sprayed or watered on.

Seven per cent. sodium chlorate exercises a good control on blackberries, but many of these treatments should be regarded as a preliminary to firing or grubbing out.

Weedicides of the selective type should be considered as an adjunct to and not as a substitute for mechanical cultured operations, for the indirect benefits conferred by the soil movement and working involved in the use of the hoe are, as already stressed, considerable.

Weed Eradication Chart

This is a list of weeds proclaimed noxious, and gives a table of quantities for chemical treatment in the proportion of pounds of chemical to gallons of water.

The various types of hormone weedicides available at present contain either 2,4-Dichlorophenoxyacetic acid (2, 4-D), 2 methyl-4 chlorophenoxy-acetic acid (M.C.P.A.), or 2, 4, 5- trichlorophenoxyacetic acid (2, 4, 5-T) as the active ingredient.

The following letters are used throughout to indicate the degree of susceptibility of each to a particular hormone:—H.S., Highly Susceptible; V.S., Very Susceptible; S., Susceptible; I., Intermediate; R., Resistant. The following table can be used as a guide to the amount of active ingredient* per acre necessary to control each weed according to its susceptibility as indicated on the chart:—H.S., $\frac{1}{4}$ lb. of active ingredient per acre; V.S., 1 lb. of active ingredient per acre; S., 2 lb. of active ingredient per acre; I., 4 lb. of active ingredient per acre; R., 8 lb. of active ingredient per acre.

*The percentage of active ingredient in a particular weedicide is stated on the label of the container.

Care should be taken not to allow hormone spray to drift with the wind when useful susceptible plants may be easily affected.

This chart was prepared by the Department of Crown Lands and Survey, Melbourne.

Common Name	Sodium Chlorate		Calcium Chlorate		Pentoxide		Arsenate Soda		Atricide		2, 4, 5-T.		Weedicides	Remarks
	Pounds : Gal. Water	Pounds : Gal. Water	Pounds : Gal. Water	Pounds : Gal. Water	Pounds : Gal. Water	Pounds : Gal. Water	Pounds : Gal. Water	Pounds : Gal. Water	Pounds : Gal. Water	Pounds : Gal. Water	M.C.P.A.	R.		
Acacia Hedge or Pricky Acacia														Cut low to ground; burn tops; watch for seedlings; hoe out.
Angled or Triquetrous Onion or														Grub before seeding, heap and burn. Alternatively apply
Allium	1:1	2:1	1:9	1:9	1:19	1:19	1:19	2:1	1:9	2:1	1	—	—	carbolic acid to corns with an oil-can.
Apple of Sodom	1:1	1:1	1:29	1:29	1:59	1:59	1:59	2:1	1:1	2:1	2	—	—	Spray on foliage rosette stage. Do not allow to fruit.
Archel of Syria	1:1	1:1	1:9	1:9	1:19	1:19	1:19	2:1	1:1	2:1	2	—	—	Should be sprayed or pulled before seeding.
Artichoke Thistle	1:1	1:1	1:29	1:29	1:59	1:59	1:59	2:1	1:1	2:1	2	—	—	Spray on foliage, soaking centre growth.
Bathurst Burr	1:1	1:1	1:29	1:29	1:59	1:59	1:59	2:1	1:1	2:1	2	—	—	Spray as early as possible, thoroughly wetting centre growth.
Bishop's Weed	1:1	2:1	1:19	1:19	1:39	1:39	1:39	2:1	1:1	2:1	2	—	—	Land should be summer fallowed and worked regularly to
														germinate seed. Regular working before sowing crop will
														destroy seedlings. Spray or hoe headlands.
Blackberry Bramble	1:1	2:1	1:9	1:9	1:19	1:19	1:19	2:1	1:1	2:1	—	H.S.	—	{ When using ordinary weedicides, cut, burn debris, spray
Italian Blackberry or Cut Leaf														{ regrowth. When using hormone spray, do not cut or burn.
Blackberry	1:1	2:1	1:9	1:9	1:19	1:19	1:19	2:1	1:1	2:1	—	H.S.	—	Cut and burn top growth. Spray regrowth.
Boxthorn	1:1	1:1	1:9	1:9	1:19	1:19	1:19	2:1	1:1	2:1	—	H.S.	—	Spray as early as possible.
Buffalo Burr	1:1	1:1	1:29	1:29	1:59	1:59	1:59	2:1	1:1	2:1	—	H.S.	—	Spray in rosette stage.
Buck	1:1	1:1	1:29	1:29	1:59	1:59	1:59	2:1	1:1	2:1	—	H.S.	—	Spray before flowering, otherwise infested areas should be
Californian Burr	1:1	1:1	1:29	1:29	1:59	1:59	1:59	2:1	1:1	2:1	—	H.S.	—	scraped, heaped and burnt to destroy seeds.
Callitrop	1:1	2:1	1:19	1:19	1:39	1:39	1:39	2:1	1:1	2:1	—	H.S.	—	Spray. Cultivate where possible.
Californian Stink	1:1	1:1	1:29	1:29	1:59	1:59	1:59	2:1	1:1	2:1	—	H.S.	—	

WEED ERADICATION CHART

Common Name	Sodium Chlorate		Calcium Chlorate		Pentoxide		Arsenate Soda		Atticide		2, 4-D M.C.P.A.	Suscepti- bility to Hormone Weedicides	Remarks
	Pounds : Gal. Water	Pounds : Gal. Water	Pounds : Gal. Water	Pounds : Gal. Water	Pounds : Gal. Water	Pounds : Gal. Water	Pounds : Gal. Water	Pounds : Gal. Water	Pounds : Gal. Water	Pounds : Gal. Water			
Camel Thorn	1:1	2:1	1:1	1:19	1:39	2:1	—	—	—	—	S.	S.	Spray in early growth. Matured growth should be grubbed, heaped and burnt.
Cape Broom	1:1	2:1	1:1	1:19	1:39	2:1	—	—	—	—	S.	S.	Spray seedlings; otherwise growth should be grubbed out and burnt. Fresh seedlings should be Dutch hoed.
Cape Tulip .. .. .	..	..	..	..	..	..	..	..	..	..	S.	—	Cultivate mid-June to end of July when corns sprouting. Cultivate in summer or early autumn when corns or seeds have not sprouted is ineffective.
Charlock or Wild Mustard	1:1	1:1	1:29	1:59	1:1	1:1	H.S.	—	—	—	—	—	Spray before seeding.
Chicory .. .. .	..	..	..	..	..	..	..	..	..	..	—	—	Should be hand-pulled when ground is wet. Spray before flowering.
Chilean Cestrum	1:1	—	1:19	—	1:1	—	—	—	—	—	S.	S.	Sprayed in early rosette stage; otherwise grubbed, heaped and burnt.
Chinese Scrub .. .. .	..	..	..	..	..	..	..	..	..	..	I.	I.	Cut low to ground and cultivate ground. Sow to crop or pasture and top-dress with superphosphate.
Cluster-flowered Vervain	1:1	1:1	1:29	1:59	1:1	1:1	—	—	—	—	—	—	Spray before seeding.
Cotocynth	1:1	—	1:19	—	1:1	—	—	—	—	—	—	—	Small areas grubbed or hand-pulled when ground is wet.
Common Bindweed	1:1	—	1:9	—	2:1	—	—	—	—	—	—	—	Spray early rosette stage; otherwise grub, heap and burn.
Common Hemp	1:1	1:1	1:29	—	1:1	—	—	—	—	—	—	—	Spray before flowering, respray when new growth appears.
Common Morehound	1:1	1:1	1:9	—	—	—	—	—	—	—	—	—	Spray before flowering period.
Common Verbein .. .. .	..	..	..	..	..	..	..	..	..	..	—	—	Spray before seeding; otherwise grub, pile and burn.
Common Frickly Pear .. .. .	..	..	..	..	..	..	..	..	..	..	—	—	Small areas grubbed or hand-pulled when ground is wet.
Drooping Broom	1:1	2:1	1:19	1:39	2:1	—	—	—	—	—	—	—	Thoroughly spray all pear joints.
English Frickly Pear .. .. .	..	..	..	..	..	..	..	..	..	..	—	—	Treat same as Cape Broom.
Erect Frickly Pear .. .. .	..	..	..	..	..	..	..	..	..	..	—	—	Thoroughly spray all pear joints.
European Dodder; any plant .. .. .	..	..	..	..	..	..	..	..	..	..	—	—	Crops should be fed off before seeding. When dry the field should be covered with straw and burnt.
Fat Hen	4:1	1:1	1:19	1:39	2:1	—	—	—	—	—	S.	—	Spray before seed maturing.
Fennel	1:1	2:1	1:19	1:39	2:1	—	—	—	—	—	—	—	Spray before branching takes place; if matured, cut low to ground and spray on cut surface to destroy root growth.
Five-Spined Saltbush	1:1	2:1	1:19	1:39	2:1	—	—	—	—	—	S.	—	Treat similar to Cape Broom.
Flax-Leaved Broom	1:1	2:1	1:19	1:39	1:1	—	—	—	—	—	—	—	Spraying unnecessary; hoe or hand-pull before seeding.
Flax-Leaved Flea Bane	4:1	2:1	1:19	1:39	2:1	—	—	—	—	—	—	—	Spray in early rosette stage; otherwise grub, heap, burn.
Foxglove	1:1	—	1:19	1:39	1:1	—	—	—	—	—	R.	R.	Grub and burn. Spray regrowth and seedlings; rotary hoe to prevent seedling growth. Sow to suitable crop.
Furze	1:1	—	1:9	—	—	—	—	—	—	—	—	—	Spraying should only be necessary on headlands, infested fields should be ploughed and well-worked before sowing.
Giant Mustard	4:1	2:1	1:29	1:59	4:1	—	—	—	—	—	H.S.	—	Spray in rosette stage.
Glaucous Star Thistle	1:1	2:1	1:19	1:39	2:1	—	—	—	—	—	S.	—	—

Common Name	Sodium Chlorate		Calcium Chlorate		Pentoxide		Arsenate Soda		Attaicide		Suscepti- bility to Weedicides		Remarks
	Pounds : Gal. Water		Pounds : Gal. Water		Pounds : Gal. Water		Pounds : Gal. Water		Pounds : Gal. Water		2, 4, 5-T.		
	1:1	2:1	1:19	1:39	2:1	1:1	2:1	1:19	1:39	2:1	2, 4, 5-T.		
Golden Thistle or Spanish Salsify	1:1	2:1	1:19	1:39	2:1	I.	—	—	—	—	—	Spray before flowering. If salt used, hoe close to surface; spread salt on cut surface.	
Gooseberry	I.	—	—	—	—	—	Land should be summer fallowed, worked regularly to germinate seeds and destroy seedling growth.	
Great Mullein	1:1	1:39	2:1	S.	—	—	—	—	—	Spray in rosette stage, thoroughly covering leaf surface.	
Grey Germander	1:1	1:39	2:1	I.	—	—	—	—	—	Thorough cultivation will control this weed. Headlands and roads must be treated.	
Hard Head Thistle	1:1	1:19	2:1	V.S.	—	—	—	—	—	Spray thoroughly when in full leaf growth. Heavily infested fields should be summer ploughed and well-worked in order to germinate seeds and destroy seedling growth.	
Hedgehog Grass	R.	—	—	—	—	—	Area infested should be burnt over, ploughed, sown to good grasses, top-dressed with superphosphate.	
Hedge Mustard	1:1	1:29	1:59	H.S.	—	—	—	—	—	Treatment same as Giant Mustard.	
Hemlock, Wild Parsnip or Wild Carrot	1:1	1:9	—	V.S.	—	—	—	—	—	Spray before flowering stage.	
Henbit, or Dead Nettle	1:1	1:29	1:59	V.S.	—	—	—	—	—	Spray in early rosette stage, before seed stalk appears. Areas so treated should not be ploughed immediately.	
Hoary Cress	—	—	—	—	—	—	Spray in rosette stage. Should not be allowed to seed.	
Illyrian Thistle	1:1	1:9	—	S.	—	—	—	—	—	Not necessary to spray. Control can be effected by cultivation.	
Ivy Leaf Sida	1:1	1:19	1:39	I.	—	—	—	—	—	Spray seedlings. Grub and burn tree growths.	
Kangaroo Apple	1:1	1:19	1:39	S.	—	—	—	—	—	Where land can be cultivated, this control should be carried out.	
Khaki Weed	1:1	1:19	—	V.S.	—	—	—	—	—	Around sheds, yards and recreation areas plants should be sprayed or hoed.	
Leek Lily	1:1	1:19	1:39	R.	—	—	—	—	—	Sprays not generally satisfactory owing to nature of leaf growth. Cultivation in summer and thorough working of fallow is best method of control.	
Luxuriant Dock	1:1	1:19	1:1	S.	—	—	—	—	—	Hormone spray recommended. Regrowth treated immediately.	
Malta Thistle	1:1	1:39	1:1	S.	—	—	—	—	—	Spray before seeding.	
Merian's Bugle Lily	R.	—	—	—	—	—	Plough, break down with rotary hoe. Rate off corns. Sow to crops or grass.	
Musk Weed	1:1	1:29	1:59	V.S.	—	—	—	—	—	Work up fallows.	
Narrow-Leaved Amsinckia	1:1	1:29	1:1	S.	—	—	—	—	—	Thorough cultivation will control this weed.	
Noogoora Burr	1:1	1:59	1:1	V.S.	—	—	—	—	—	Spray before seed sets.	
Nat Grass or Nut Sedge	S.	—	—	—	—	—	Should be grubbed. Roots and nuts burnt.	
Onion Weed	R.	—	—	—	—	—	Owing to nature of leaf growth, spraying is not recommended. Plants should be hoed, heaped and burnt, followed by thorough cultivation.	

WEED ERADICATION CHART

Common Name	Sodium Chlorate		Calcium Chlorate		Pentoxide		Arsenate Soda		Alacide		Suscepti- bility to Weedicides	Remarks
	Pounds : Gal. Water	Pounds : Gal. Water	Pounds : Gal. Water	Pounds : Gal. Water	Pounds : Gal. Water	Pounds : Gal. Water	Pounds : Gal. Water	Pounds : Gal. Water	Pounds : Gal. Water	Pounds : Gal. Water		
Ord. Tobacco Plant of N. America												
Ox Eye Daisy	1:1	2:1	1:19	1:39	2:1	1:19	1:39	2:1	2:1	1:19	2:1	Seedling plants during February and March. Mature plants during June and July. Rank growth, waste stalks and seedlings should be ploughed under.
Ox Tongue	1:1	1:1	1:29	1:59	1:1	1:29	1:59	2:1	1:1	1:29	1:59	This weed is best controlled by cultivation.
Pampas Lily of the Valley	1:1	1:1	1:19	1:19	1:1	1:19	1:19	1:19	1:1	1:19	1:19	Spray in rosette stage of growth.
Patonson's Curse or Purple Bug- loss	1:1	1:1	1:9	1:9	1:1	1:9	1:9	1:9	1:1	1:9	1:9	Respray whenever fresh growths appear.
Perennial or Californian Thistle	1:1	1:1	1:19	1:39	1:1	1:19	1:39	2:1	1:1	1:19	2:1	Spray in rosette stage.
Pitch Weed	1:1	1:1	1:19	1:39	1:1	1:19	1:39	2:1	1:1	1:19	2:1	Spray before flower develops; treat regrowths similarly.
Prairie Ground Cherry	1:1	1:1	1:9	1:19	1:1	1:9	1:19	2:1	1:1	1:9	2:1	Clean cultivation will control this weed.
Prickly Lettuce	1:1	1:1	1:29	1:59	1:1	1:29	1:59	2:1	1:1	1:29	2:1	Spray before fruit sets.
Prickly Poppy	1:1	1:1	1:29	1:59	1:1	1:29	1:59	2:1	1:1	1:29	2:1	Spray before flowers appear.
Prickly Saltwort	1:1	1:1	1:29	1:59	1:1	1:29	1:59	2:1	1:1	1:29	2:1	Spray before flowers appear.
Ragwort	1:1	1:1	1:29	1:59	1:1	1:29	1:59	2:1	1:1	1:29	2:1	Spray any time before flowering. If flowers are showing, these should be cut, piled and burnt and plant sprayed.
Red Ink Plant or Dye Berry	1:1	1:1	1:29	1:59	1:1	1:29	1:59	2:1	1:1	1:29	2:1	Spray before flowering; otherwise grub, heap and burn.
Sacred or Blessed Thistle	1:1	1:1	1:29	1:59	1:1	1:29	1:59	2:1	1:1	1:29	2:1	Spray before flowering.
Sand Mustard or Sand Rocket	1:1	1:1	1:9	1:19	1:1	1:9	1:19	2:1	1:1	1:9	2:1	Spray before flowering.
Scotch or Heraldic Thistle	1:1	1:1	1:19	1:39	1:1	1:19	1:39	2:1	1:1	1:19	2:1	Spray at early stage of growth; if mature, grub, heap, burn.
Shore Thistle	1:1	1:1	1:19	1:39	1:1	1:19	1:39	2:1	1:1	1:19	2:1	Spray in rosette stage.
Skeleton Weed	1:1	1:1	1:10	1:20	1:1	1:10	1:20	2:1	1:1	1:10	2:1	Spray in rosette stage.
Soldier Thistle	1:1	1:1	1:29	1:59	1:1	1:29	1:59	2:1	1:1	1:29	2:1	Spray before flowering.
Spear Thistle	1:1	1:1	1:29	1:59	1:1	1:29	1:59	2:1	1:1	1:29	2:1	Spray in rosette stage.
Spiny Broom	1:1	1:1	1:19	1:39	1:1	1:19	1:39	2:1	1:1	1:19	2:1	This plant must be thoroughly grubbed, heaped and burnt.
Spiny Emex, Three-cornered Jack, or Cat's Head	1:1	1:1	1:19	1:39	1:1	1:19	1:39	2:1	1:1	1:19	2:1	Spray before flowering. If mature, ground surface must be scraped, heaped and burnt.
Spiny Rush	1:1	1:1	1:19	1:39	1:1	1:19	1:39	2:1	1:1	1:19	2:1	Should be burnt, roots grubbed out, piled to dry and burnt.
Spotted Thistle	1:1	1:1	1:19	1:39	1:1	1:19	1:39	2:1	1:1	1:19	2:1	Spray in rosette stage.
Spreading or Three-flowered Rigstade	1:1	1:1	1:29	1:59	1:1	1:29	1:59	2:1	1:1	1:29	2:1	Spray before flowering.
Squirring Cucumber	1:1	1:1	1:10	1:20	1:1	1:10	1:20	2:1	1:1	1:10	2:1	Treat same as Gooseberry Cucumber.
Star Thistle	1:1	1:1	1:19	1:39	1:1	1:19	1:39	2:1	1:1	1:19	2:1	Spray in rosette stage.
Stemless Thistle	1:1	1:1	1:19	1:39	1:1	1:19	1:39	2:1	1:1	1:19	2:1	Spray in early rosette stage.

WEED ERADICATION CHART

Common Name	Sodium Chlorate Pounds : Gal. Water		Calcium Chlorate Pounds : Gal. Water		Pentoxide Pounds : Gal. Water		Arsenate Soda Pounds : Gal. Water		Atricide Pounds : Gal. Water		Susceptibility to Hormone Weedicides	Remarks
	2, 4-D M.C.P.A.	2, 4, 5-T.										
Sticky Bartsia . . . . .	..	..	..	..	..	..	..	..	..	..	S.	Should be hand-pulled when ground is wet. Cultivation with well-worked fallows will control this weed.
Stinking Mayweed or Fetid Chamomile . . . . .	..	..	..	..	..	..	..	..	..	..	I.	Infested areas should be drained, sweetened up, and sown to suitable grass.
Stinkwort . . . . .	..	..	..	..	1:10	1:10	1:20	2:1	..	..	S.	Spray before flowering. Cultivate, sow down to cereal crop as a cover to pasture of rye grass and sub. clover.
St. Barnaby's Thistle	1:1	..	..	..	1:10	1:10	1:20	2:1	2:1	..	S.	Spray in rosette stage.
St. John's Wort . . . . .	..	..	..	..	1:10	1:10	1:20	2:1	2:1	..	V.S.	Spread salt by hand around base of plants before flowering.
Sweet Rattle	1:1	..	..	..	1:29	1:29	1:59	4:1	4:1	..	V.S.	Spray plants wetting foliage and stems; regrowth similar.
Syrrian Thistle	1:1	..	..	..	1:29	1:29	1:59	4:1	4:1	..	S.	Spray in rosette stage.
Terrible Weed	1:1	..	..	..	1:29	1:29	1:59	4:1	4:1	..	S.	Spray before flowering stage.
Torn Apple	1:1	..	..	..	1:29	1:29	1:59	4:1	4:1	..	R.	Spray in early rosette stage; grub, pile, burn mature plants.
Tiger Pear . . . . .	..	..	..	..	1:29	1:29	1:59	4:1	4:1	..	R.	Grub, pile and burn; otherwise spray with arsenic pentoxide solution.
Topped Lavender	1:1	..	..	..	1:19	1:19	1:59	4:1	4:1	..	R.	Spray before flowering; otherwise grub, heap and burn.
Treacle Mustard	1:1	..	..	..	1:29	1:29	1:59	4:1	4:1	..	H.S.	Summer ploughing and thorough working of fallows will control this weed. Spray fieldlands and waste places.
Tutsan	1:1	..	..	..	1:10	1:10	1:59	4:1	4:1	..	I.	Grub and burn. Spray regrowth.
Twiggy or Spurious Mullein	1:1	..	..	..	1:29	1:29	1:59	4:1	4:1	..	I.	Treat in rosette stage or before flowering; otherwise should be grubbed, piled and burnt.
Variable Groundsel	1:1	..	..	..	1:29	1:29	1:59	4:1	4:1	..	V.S.	Spray before flowering.
Water Hyacinth	1:1	..	..	..	1:29	1:29	1:59	4:1	4:1	..	V.S.	Necessary to empty and clean out dams and watercourses; otherwise apply hormone sprays to foliage.
Whitehorse Nettle or Prickly Nightshade	1:1	..	..	..	1:29	1:29	1:59	4:1	4:1	..	S.	Spray before flowering.
Wild, Bitter, or Bastard Melon	1:1	..	..	..	1:29	1:29	1:59	4:1	4:1	..	S.	Spray in early stage before runners and fruit form; otherwise should be rated, piled and burnt.
Wild Gladiolus . . . . .	..	..	..	..	..	..	..	..	..	..	R.	This weed should be hand-pulled and corns heaped and burnt. Summer cultivation, sowing to grass, and top-dressing will control regrowth.
Wild Mignonette, or The Weld, or Dyer's Weed	1:1	..	..	..	1:19	1:19	1:59	4:1	4:1	..	S.	Spray in rosette stage.
Wild Radish, or Jointed Charlock	1:1	..	..	..	1:19	1:19	1:59	4:1	4:1	..	H.S.	Spray before flowering.
Wild Sage	1:1	..	..	..	1:19	1:19	1:59	4:1	4:1	..	R.	Spray in early stage of growth before flowering.
Wild Teasel	1:1	..	..	..	1:29	1:29	1:59	4:1	4:1	..	R.	Should be grubbed, heaped and burnt.
Wild Turnip	1:1	..	..	..	1:29	1:29	1:59	4:1	4:1	..	H.S.	Work fallows often and have sowing as late as possible. Spray before flowering.

THE *Lawn* . . .

by DAVID MATTHEWS (Curator, Footscray)

THE lawn is an important part of most home gardens, providing beauty and utility. The space allotted to it should be in proportion to the size of the block of land — one-third of the area devoted to the lawn and two-thirds for ornamental and utility garden would meet most home requirements. Its outlines should be simple and conform to the general planning scheme, either formal or informal.

There should be no intricate bends or angles where the mowing machine cannot be worked with comfort. Its expanse should not be broken by adding too many features or the indiscriminate planting of shrubs and trees on its surface. This at once detracts from its appearance and creates extra work by having to attend to extra clipping of edges. A feature of outstanding quality properly placed and one or more trees in picked positions, according to the expanse of lawn, would be permissible. The tree or trees should be of outstanding beauty and in proportion when fully grown to the size of the home and the space they are to occupy.

Determining the Grade or Levels

This is an important step and one that must be worked out with the greatest care, for when once established its level and contour should not have to be altered. Where the home is built on sloping ground every effort should be made to so grade the area immediately surrounding the house as to give the impression that the building was erected on a level surface. The lawn may then slope away naturally or be further terraced at varying levels, always endeavouring to maintain a balanced effect between the house and its surrounds. During grading conserve all top soil.

Drainage

After determining the general outline of the lawn and grading the existing soil to conform with the finished levels (making

allowance for the required amount of good soil needed for the growing of the lawn) drainage is the next important factor. To get the maximum amount of pleasure from the lawn it must be sufficiently well drained at all seasons of the year. Good drainage provides this comfort, as well as ensuring a healthy growth of grass. Agricultural pipes of 3 in. diameter, properly laid, provide the best underground drain. To get the best results the drains should be at least 18 in. under the surface at the shallow end; they should be given a fall of not less than one inch in 12 ft., and they should be laid on an even grade and each joint kept one-quarter inch open. When the pipes are laid to line and levels it may be found necessary to put down more than one line, or to add subsidiary branches to the main line. This can be determined only by the nature of the soil. Over the pipes a layer of coarse clinker ash, broken stone, or some other similar material is placed, on the top of which should be a covering of straw or similar litter. This latter is to prevent the soil (which must now be replaced, or at least the best quality of it) from working down to the pipes and preventing the surplus soil water from quickly draining away.

Cultivation and Soiling

As the lawn is a permanent feature, the preparation of the soil must be thorough. There should be 8 in. of even quality soil above the sub-soil. This should be worked into a fine tilth and graded evenly to conform to the finished surface levels. During soil preparation avoid bringing any clay or inferior substance into the top 8 in. of

PREPARING AND SOWING

surface soil. If soil has to be added to give the required depth, insist that it be a good quality loam, free from injurious matter and perennial weeds or their seed.

Fertilisers

In warm climates and on very sandy soils apply well-decayed (short) stable manure, spread over the area in a 2 in. thick layer and worked well in; or artificial manure made up as follows: Two parts superphosphate, one part sulphate of ammonia, half a part of sulphate of potash, at the rate of two ounces to the surface yard. When available, the artificial manure known as market garden manure may be used at the rate of two ounces to the surface yard. The above are splendid soil improvers for lawns

Lime

Soils spoken of as acid soils indicate they are naturally deficient in lime; those referred to as alkaline soils contain lime naturally in their make-up. The degree of acidity of the soil has a very important bearing on the welfare of the lawn grasses. It is measured by a scale called p.H. On this scale 7 indicates neutrality; lower numbers indicate acidity, and higher numbers alkalinity. A p.H. of 6.5 to 7 is usually satisfactory for the majority of lawn grasses, the exception being the *Agrostis* family, of which several varieties are in general use for fine grass lawns. These are best suited with a p.H. value between 6 and 6.5. An approximate value of the p.H. content of the soil can be obtained by using one of the reliable soil-testing outfits on the market. If the soil is below p.H.6, then a dressing of lime at the rate of 3 oz. to the sq. yd. should be given after the grading and final soiling, and at least three weeks before the manure is applied.

Final Levelling

The final levelling is accomplished by putting in guide pegs, then raking the soil to conform to the correct levels. The surface must now be rolled with a 5 to 10 cwt. roller. After rolling many depressions will show up. These are filled and the surface again raked, then rolled again. At this stage any flower-beds or borders are marked out, and if so desired a two or three-inch margin of concrete is placed to line and level along the surround. The concrete margin should not be made wide enough to look obtrusive. The surface now should have

a final raking and be allowed to stand for four weeks. This will give any weed seeds time to germinate. Lightly hoe with a flat sharp hoe, and rake over again to clear off the weeds and make a receptive seed bed. It is essential that all preparatory work be completed some weeks before sowing time.

Sowing Grass Seed

September and October or March and April are the best months for sowing in general. Seed can, of course, be sown at other times, but winter and summer sowings both have drawbacks, as more care must be taken to establish the grasses. In summer the young grass is likely to scald off in patches, no matter how regularly the seed bed is watered, and in winter sowings such seed as the *Agrostis* family and fine couch grass will never germinate satisfactorily.

Choose a fine, calm day and sow on a well-prepared firm seed bed. Broadcast the seed by hand—sowing one way lightly, then cross-sow the opposite way. After sowing rake the seed in lightly, aiming at covering the seed completely, but not more than a quarter of an inch for the fine-seeded varieties. The seed sowing and covering must be done when the seed bed is in good working condition, and not when the surface soil is at all adhesive.

After sowing the bed should be given a light watering. If the weather is warm do not allow the surface soil to get dry; by keeping it moist the seed will germinate more evenly and if the weather becomes windy there is less chance of the seed being blown about. Be sure not to let the water fall heavily on the seed bed or water it so long as to let any free water run on the surface, otherwise the seed will be dislodged. When the new lawn is high enough to cut with a mower give the area a rolling. Wait for a day or so, and if the weather is fine and the surface dry cut the grass, but see that the mower is sharp and well adjusted, and the rollers lifted so that the machine will not cut too close to the crown of the young grass plants.

Attention must now be paid to watering and mowing, and eliminating weeds if they appear.

The fine grass mixtures often show signs of yellowing not long after they have been sown. When this occurs give the lawn a watering with liquid manure made by dissolving 1 oz. of nitro chalk or sulphate of

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ammonia to a gallon of water. Apply it with a watering can at the rate of one gallon to 4 sq. yds.

In districts where birds are troublesome the seed can be slightly dampened with water and mixed with sufficient red lead powder to cause the seed to have a pinkish colour. The seed is then sown in the ordinary way.

Varieties and Quantities to Sow

There are many kinds of grasses used for the making of lawns. Selection of the variety depends on such factors as soil, water supply, climatic conditions, and the use for which the lawn is intended. A good lawn should be composed of perennial varieties of grasses that are fine in texture and so blended to given an even colour throughout the year.

Fine lawn mixture for moderate temperatures having a mean maximum up to 69° Fahr., where ample watering facilities exist and suitable alike for front or back gardens: Chewing's Fescue, *Festuca rubra*, var. fallax, 3 parts; Brown-top, *Agrostis tenuis*, 1 part. Mix thoroughly together and sow at the rate of 1 lb. seed to 16 sq. yds.

Fine lawn mixture for warm temperatures having a mean maximum up to 72° Fahr., where ample watering facilities exist: Drylands' Brown-top, *Agrostis aristata*, 2 parts; Kentucky Blue Grass, *Poa pratensis*, 1 part. Mix thoroughly together and sow at the rate of 1 lb. seed to 16 sq. yds.

Fine lawn mixture for hot districts, where the water supply is limited: Kentucky Blue Grass, *Poa pratensis*, 1 part; Fine Couch Grass, *Cynodon dactylon*, 1 part. Mix together and sow at the rate of 1 lb. of seed to 16 sq. yds. As couch grass will not germinate in cold weather, this mixture should not be sown until the springtime unless the district in which the seed is to be sown is not subject to frosts. It could then be sown earlier, so that it would establish before the hot, dry weather sets in.

Fine lawn mixture for cool late districts: Chewing's Fescue, *Festuca rubra*, var. fallax, 3 parts; Brown-top, *Agrostis tenuis*, 1 part; Kentucky Blue Grass, *Poa pratensis*, 1 part. Mix thoroughly and sow in spring only at the rate of 1 lb. seed to 16 sq. yds.

Fine lawn mixture for shaded areas: Chewing's Fescue, *Festuca rubra*, var. fallax; Kentucky Blue Grass, *Poa pratensis*; Velvet

Bent Grass, *Agrostis canina*; Wood Meadow Grass, *Poa nemoralis*; Flawn, *Zoysia matrella*.

The above varieties recommended for shady areas may not be all readily available, but some of them are usually procurable. Two or more available varieties could be mixed together and sown at the rate of 1 lb. to 16 sq. yds. Shade is usually created by trees on the lawn area. Therefore, as the grasses not only have to contend with the shade but have to compete with the tree roots for nourishment and moisture, extra watering and feeding will be necessary to maintain a healthy lawn growth.

Coarser lawn mixtures: These are much quicker in establishing, but need a great deal more cutting. They will not stand up any better to hard wear than the finer growth grasses, and they never give the same nice effect as a fine texture lawn grass mixture. The principal variety used in such mixture is Certified Perennial Rye Grass, *Lolium perenne*. As this grass alone is likely to grow tufty, a filler variety is usually sown with it. The following mixtures are therefore often used:—

Certified Perennial Rye Grass, *Lolium perenne*, 4 parts; Kentuck Blue Grass, *Poa pratensis*, 1 part. Mix and sow at the rate of 1 lb. to 12 sq. yds. In place of Kentucky Blue Grass, Creeping Bent Grass, *Agrostis Alba*, or Chewing's Fescue could be used in the same proportion and sown at the same rate.

Clovers are sometimes sown with Certified Perennial Rye Grass as a filler and soil improver, and often because certain people like clover in their lawns. White Clover, *Trifolium repens*, and Strawberry Clover, *Trifolium fragiferum*, are the varieties used. One ounce of clover seed to every pound of rye grass would suffice.

Rye Grass and Clover both prefer alkaline soils, and so are well suited to the heavy volcanic loams. Water is essential to keep them fresh and green throughout the summer.

Buffalo Grass, *Stenotaphrum dimidiatum*, is still favoured by many home gardeners, especially on sandy sea-coast soils or in the warmer areas where water is scarce. The soil preparation is as previously recommended. Buffalo Grass seed is unprocurable, therefore small well-rooted sets are planted over the surface at six-inch intervals during springtime. When the runners commence to grow they are laid down into

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the soil; this helps to get a quick coverage. A sprinkling of Kentucky Blue Grass sown over the area after the Buffalo Grass sets have been planted will ensure a green verdure during the winter months, when the Buffalo Grass is dormant.

Fine Couch Grass lawns are often established in exactly the same way as a Buffalo Grass lawn, and the Kentucky Blue Grass used for winter effect.

Flawn Grass, *Zoysia matrella*: This grass is not as yet readily available in Australia, nor has much time been devoted to finding out its climatic adaptabilities. The family *Zoysia* is represented by several members, mostly originating from the Orient. The variety *matrella* has been selected as the outstanding variety for general lawn work. Trial plots in the Melbourne area prove that this variety has many qualities that should rank it as a first-class home garden lawn grass. Its slow-growing habit, as far as top growth is concerned, eliminates a lot of lawn cutting. Its colour and texture are all that could be desired. It forms a dense, close, even, mat-like cover, and requires no particular type of soil to do well. In general appearance it somewhat resembles *Chewing's Fescue*. It can be planted by seed, divisions, or fragments of the roots with growing points attached. Spring planting is desirable for either method. *Zoysia matrella* is extensively used in America for all lawn purposes, and is giving every satisfaction in all but the very cold climates.

In the Melbourne district *Zoysia* shows signs of being affected by the cold in May, and throughout the months of May, June and July there is a slight browning off of the foliage. Growth again commences in August, and within a few weeks the Flawn is in good colour and looking well again. In districts with a little higher mean minimum temperature than Melbourne — Melbourne's mean minimum is 49.6 — it would probably not be affected by the cold at all.

Plants Other Than Grasses for Lawns

Lippia nodiflora, var. *repens*, Frogfruit: This creeping plant belongs to the *Verbena* family. Because of its close-creeping habit it has been used for lawns and nature strips. Rooted sets are planted on prepared areas and planting can be carried out in autumn or spring. This plant is soil-hardy and has a wide climatic range. In the dry

weather it will require water. It stands cutting with a lawn mower.

Dichondra repens, Kidney Weed: This native creeping perennial is a low-growing plant with small kidney-shaped leaves. It is on the market in America as a substitute for lawn grass. Its hardy nature, plus the fact that it makes a good ground cover for shaded dry areas, gives it a limited use. It is not recommended here as a substitute for lawns. It is planted by seeds or divisions of the creeping stems.

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Sagina, synonymous with *Spargula*: The varieties *subulata* and *pilifera* have been used for many years as substitutes for lawn grasses where very small areas or narrow verges are to be treated with a ground cover. These plants belong to the *Carnation* family, and produce small starry white or pale yellow flowers. Therefore they are not true mosses, although they cover the ground with a moss-like growth. For very small areas, for edgings, and as a setting for carpet bedding they have decorative value. For areas of any extent they are prone to become infested with permanent weeds and become uneven in growth, necessitating re-planting after a few years. They also become very spongy, holding much water in the winter months, which renders them unsuitable for a utility lawn. There is a golden-foliaged form of the variety *pilifera*. Spring or autumn is the best time to start the plants. Little pieces about $\frac{1}{2}$ in. square are set at 2 in. intervals; these quickly unite to make a carpet-like cover. The ground should be well prepared before planting, and every effort made to get a firm weed-free surface.

Diseases and Insect Pests Affecting Lawns

Fairy Ring Fungus: This troublesome fungus disease is caused by *Marasmius oraeas*. The fruiting stage is usually readily noticeable by a ring of small mushroom-like growths that appear on the surface of the lawn during summer and autumn. Its presence in the lawn is first indicated by circular patches or small rings of deep green lawn growth, the lawn grass apparently at this stage benefiting from extra nitrogen supplied by the fungus. The diameter of the rings gradually increases until they are often many feet across. During this period

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of growth within and immediately outside the circle becomes so completely infested, with the mycelium of the fungus that any water applied will not penetrate the affected area. This, together with the fact that the physical condition of the soil is rendered unfit for grass growth, causes the lawn grass to die out within the circular patches affected.

Remedy: Loosen the affected area by using a long-tined digging fork. Drive the fork well into the turf and partly raise the grass. Do this all over the affected area so that it will take water freely. Give the affected area a good soaking of water. Then on the following day dissolve 2 oz. of Ferric Sulphate (Sulphate of Iron) to each gallon of water, and give the treated areas a liberal watering of the solution. After about a week the treated areas could be loosened up and given a dressing of blood and bone manure, to which has been added a little superphosphate. Sow some grass seed of the same mixture as the lawn and give a light top-dressing of soil. If the lawn is badly affected it would be wise to top-dress and fertilise it all over. This would prevent any patched appearance.

Dollar Spot: During humid conditions, which occur usually in late spring and autumn, fine grass lawns are often affected with this trouble. It appears in small circular patches, giving to the lawn a mottled appearance. Its presence is due to *Sclerotinia homoeocarpa*. Fortunately, today there is on the market a preparation for treating this disease. Its trade name is an abbreviation of its chemical compounds, P.A.C.A.—Phenyl-Amino-Cadmium Acetate. Directions for its use are on the containers.

Brown Spots often appear in newly sown fine grass lawns. These often resemble Dollar Spot in its early stages. This condition quickly clears up if the lawn is given a watering of the following mixture: 1 oz. Sulphate of Ammonia, 1 oz. Sulphate of Iron, dissolved in one gallon of water. Give the surface a liberal watering of the solution.

Weeds in Lawns

Weeds will keep appearing in lawns and, although a healthy growth of lawn grasses minimises the trouble to some extent, certain strong types are sure to make their appearance. Research, however, has now been able to recommend certain hormone weed-killers. These are effective destroyers of most broad-leaved varieties. They will also destroy clovers, and should not be

applied to lawns where clover is desired, except by spotting the troublesome weeds only with a mist spray of the liquid. The mixtures are applied as a mist spray over the whole surface of the lawn when the infestation of weed growth is bad, or just by spotting when the weeds occur in isolated patches. The mixtures are best applied in dry weather, and the lawn should not be cut for at least a week after the application. One mixture is sold under the name of Methoxone, and another as 2,4-D. Instructions are attached to the containers.

Top-dressing Lawns

Autumn or spring is best for this work. Sufficient fine dry soil, free from weeds and if possible from their seeds, should be available to cover the area with about $\frac{1}{4}$ in. of soil. Select fine weather for the carrying out of the work. Cut the lawn, free it from any weed growth if any exists, lightly loosen any bare patches and sprinkle some lawn grass seed of the same mixture as the lawn is composed of on any bare or sparsely-covered patches. Give the lawn surface a dressing of artificial manure made up as follows: One part of blood and bone manure, one part of superphosphate, half a part of sulphate of potash. Mix together and apply at the rate of 2 oz. to the surface yard.

How to Destroy Onion Grass

Onion Grass (*Romulea bulbiodium*), an introduced weed, is now so prevalent that many home gardeners are faced with the problem of how to get rid of it. Onion grass is a bulbous plant, growing freely from seed and divisions of the bulbs. It has a definite growing and resting period. Therefore once the bulbs have gone to rest there is little that can be done with it, as the bulbs will start into growth with the first autumn rains. But when growth is well advanced and before the bulbs show signs of ripening—that is, before any browning of the foliage takes place—cultivate the ground thoroughly either by the use of a rotary hoe or by using a spade or mattock. Let the ground lay for a while, and if necessary cultivate again. Onion grass is little or no trouble on cultivated areas, and cultivation soon eradicates it. Hence, also, the wisdom of using onion grass infested areas for a crop that needs cultivation for a season or so before sowing the lawn grass seed.

Propagation—Expands your Garden

★ SEED SOWING ★ LAYERING ★ CUTTING, etc.
★ GRAFTING

PROPGATION or reproduction of plants in the garden is interesting as well as profitable, and develops a greater appreciation of plant life, as some study of the various requirements directly related to plant life is necessary to success.

The reproduction of plants is divided into three main groups:—

- (a) *Seeds*, where seed is used.
- (b) *Spores*, used in propagating ferns, etc., and
- (c) Where actual plant parts are used as in: (1) *stem or root cuttings*; (2) *division or separation* of an established plant; (3) *layering*, where a section of an established plant is rooted while still attached; and (4) *grafting*, where a scion is applied to another plant (the scion may contain a number of buds or consist of a single bud as in shield budding).

Where seed is used the method is termed sexual, as some fusion of male and female parts is necessary to produce the fertile seed. Plants raised from seed will vary to some degree from the parent plant, and for this reason seed should be harvested only from true to type plants. It is the common method used with annuals, vegetables, and some trees and shrubs that are difficult to propagate by other methods.

Spores and buds will reproduce all of the character of the parent plant, and are always used where exact reproductions are desired. This method is termed *asexual*.

Propagation by Seed

As only a viable seed has the power to germinate, factors affecting the length of life of the seed must be considered. Seed should be harvested during dry weather and dried thoroughly before storage. With few exceptions, seed is stored dry so that the seed can pass through the final stage of maturity necessary before germination is possible.

Seed is best stored at low temperatures (40°-60°). Most homes can produce some spot where the temperature does not rise much beyond 60° and where seed can be stored under good conditions.

The Seed Bed

The seed bed to be used for annuals and vegetables should be established where maximum sunlight is available at all times (there is no satisfactory substitute for natural light), and the bed should be raised

above soil level to ensure good drainage. The seed bed should consist of a good friable sandy loam. A good compost can be obtained by mixing well together the following: 3 parts by measure of sandy loam, 1 part leaf mould, and 1 part coarse sand. The sandy loam provides the bulk, the leaf mould ensures aeration and moisture-holding capacity, and the coarse sand ensures good drainage.

Seed beds should not be rich in plant foods, as the healthy seed has sufficient food stored within the seed coat for its immediate needs. Research workers have shown that only small additional nourishment is necessary, and this is provided by applying superphosphate 1½ oz. and lime ¾ oz. for each bushel of compost in the seed bed.

Seed Sowing

The season of sowing and the condition of the seed have some influence on how seed is sown. Seed is sown deeper in summer than in spring; fresh seed can be sown deeper than old.

The later method of handling the seedlings also influences seed sowing. If the seedling is to be transplanted while very small the seed can be sown broadcast, but if the seedling is to remain in the bed for some time the seed should be sown in rows to allow for easy weeding. As seed varies greatly in size, no set table can be given as to the depth of sowing but in general viable seed can be sown at a depth equal to twice the diameter of the seed when growing conditions are good.

Management of the Seed Bed ...

The compost in the seed bed should be worked into good condition before sowing by forking over a few days before required, and water applied if necessary to moisten the soil. Over-watering should be avoided.

When the bed has settled down seed can be sown and the necessary covering applied when further watering is given to complete the operation of seed sowing. Until germination occurs the seed bed should be kept moist at all times, but extremes must be avoided at all costs, as this factor is probably the prime cause of seedlings "damping off."

During periods of high temperatures some control of moisture loss by evaporation can be obtained by providing shade over the seed bed. Some light material, such as cheesecloth or muslin, is excellent, as this allows beneficial light rays to penetrate, at the same time reducing the temperature over the seed bed. Shade should be discontinued as soon as germination is apparent unless extreme temperatures prevail. Then shade is provided only during the hottest periods of the day. Shade material is always applied at least 12 in. above the bed to permit ventilation over the area.

Handling the Seedling

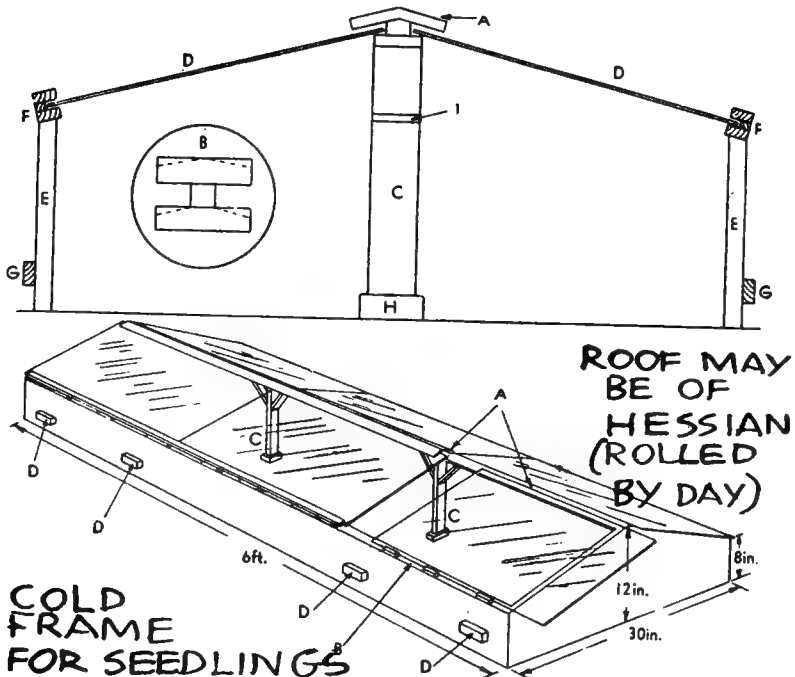
As the check in the development of the plant increases with the size of the seedling, transplanting or pricking-out should occur as soon as the seedling is large enough to handle.

It is most important that the seedlings, whether pricked out into trays or transplanted to the permanent position, should receive an immediate watering sufficient to settle some soil around the roots. Any movement of seedlings is best done during cool weather; otherwise some protection should be provided until the young plant is established.

Check the growing time of your seeds; don't be caught with dozens of plants ready to move outdoors when there is still a month of frost ahead.



COLD FRAME CONSTRUCTION

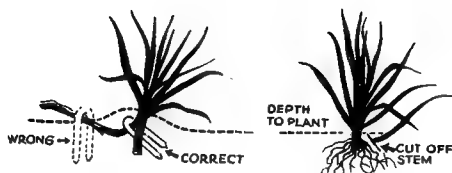


Here is constructional data for a cold frame that you can easily and cheaply make for your garden:—

Timber required for a frame 6 ft. long is 22 lineal feet of 8 in. x 2 in., 32 lineal feet of 2 in. x 3/4 in. batten if the ridge is built as at A in the upper diagram, or 26 lineal feet if it is built as at B; 6 lineal feet of 1 in. x 3/4 in., and 6 lineal feet of 3/4 in. x 3/4 in. Timber should be reasonably dry. Pine is quite satisfactory if oil-soluble wood preservatives such as zinc or copper naphthenate or pentachlorophenol (available in proprietary preparations) are brushed on; a soaking for 20 minutes is preferable.

Upper Diagram: A—Ridge made of 2 in. x 3/4 in. batten. The top consists of two lengths of batten jointed at an angle and fastened to the bottom piece of batten by 1 in. x 3/4 in. timber. B—Alternative simpler type of ridge made from two lengths of 2 in. x 3/4 in. batten joined by 1 in. x 3/4 in. timber. If the sides are bevelled as shown, the depth of the joining piece can be halved. C—Support batten of 2 in. x 3/4 in. timber. D—24 oz. glass sheet with an overlap of about 1 in. at each end. E—Sides of 8 in. x 2 in. timber. F—Side supports for glass made of two lengths of 1 in. x 3/4 in. timber joined at intervals by 4 in. lengths of 3/4 in. x 3/4 in. timber. G—Piece of wood 2 in. x 3/4 in. and 4 in. long for lifting the frame. H—Foot for supporting batten. I—Brace from the supporting batten to the ridge.

Lower Diagram: A—Ridge cut away to show glass resting on ridge. B—Top of side support removed to show the 4 in. lengths of timber for holding glass in position. The gaps are necessary to enable rain-water to drain away. C—Supports for ridge, each with a foot to prevent the support penetrating the ground. D—Pieces of wood 2 in. x 3/4 in. for lifting the frame.



Layering...

INCREASE YOUR PLANTS BY LAYERING STEMS

THREE important sections of asexual reproduction are layering, division, and separation. When layering is adopted, the new plant takes root while still attached to its "parent," and, until it can fend for itself, it is dependent on the "parent" for its food supply. Do your layering in late winter or early spring to give a complete growing season before transplanting.

LAYERING IS AN EASY METHOD

In the process of division, parts of the "parent" plant are torn or cut off (often before they have rooted). In species that propagate by separation, rooted parts (or parts not yet rooted) of the "parent" detach themselves when the growing season is over to become new plants.

Some plants (such as rhubarb) that do not separate naturally may be divided. Many species that do not naturally multiply by division or separation may be successfully propagated by layering.

You will find layering a simple way to increase the number of your plants. Indeed, some plants layer themselves. Your strawberries will send out runners, the plantlets on which will root into the ground quite a distance from the "parent" plant.

When layering strawberries or other plants that develop by runners, fill 3-in. flower pots with a good sandy soil. Choose the most vigorous plants and remove from each all runners except the most sturdy four. Just beyond the first young plantlet on each runner cut the end off. Place the pots in soil right up to their rims.

Now put a plantlet on the top of each pot and fasten it down with a staple or a

peg. Be sure that the soil is kept moist. When the plantlets have rooted firmly in the pots you can sever the lifelines between them and their "parent." Later you can transplant.

PLANT A BRANCH — LET IT ROOT

In ordinary, or *single layering*, you plant a branch and let it root; then cut it off and nurse the shoot.

This means that you bury a part of a plant stem (behind the tip) in soil. When the buried portion forms roots, a new plant develops. Long-branched shrubs are highly suitable for layering.

Cut the stem (a little below a node) with a sharp knife. Let the depth of the cut be about one-third of the thickness of the stem and about an inch in length. It should go upward towards the tip of the stem. This injury to the plant-stem partly checks the sap flow and hastens root formation.

The wounding is sometimes done by merely giving the stem a severe half-twist to cause a partial break. Another method is to split the branch with a chisel and place a small wedge of wood in the opening.

LAYERING AND DIVIDING

TIP-LAYER YOUR RASPBERRIES

Tip-layering is a very easy method. You can use it successfully for your raspberries and loganberries. You just bend a cane over and bury its tip to a depth of about three inches in the soil. Peg it in place with a wire staple or a forked twig to keep it from springing out. In the spring you can cut the new plant that has formed free from its "parent" and later transplant it. The soil must be kept moist.

In *compound* or *serpentine layering*, plants that have long supply-stems (such as the vines) have alternate nodes pegged down. The stem thus undulates over the ground, under the ground, over the ground, under the ground, alternately.

A few plants will respond to *continuous layering*. In this the whole branch (except the tip) is buried in three inches of soil. New plants form right along the buried stem.

INCREASING YOUR STOCK OF SHRUBS

Mound or *stool layering* is suitable for the production of new shoots from short-stemmed, stiff-branched shrubs. In this method the shrubs are cut back the previous season and a mound of sandy soil is built over the bases of the shrub stems.

It will aid the quick production of new roots if, preparatory to being covered with soil, the shrub stems are wounded near the ground. When the new shoots are well-rooted they can be severed from the "parent" as individual shrubs.

The Chinese, or pot method, of layering is used by nurserymen for plants with

"leggy" stems. The stems are wounded while still growing in their natural position and bound with earth or some other moisture-holding material held in place with raffia or cloth bands. As soon as new roots have filled the ball of earth or moss, the stem is severed below the wound and planted in a flower-pot.

GETTING MORE PLANTS BY DIVISION

Division is the simplest of all methods of plant propagation. You just dig up your thick-growing herbaceous perennials (phlox, iris, peony, rhubarb) and cut the large clumps into smaller pieces with a sharp spade. Pick the best pieces and replant them.

Some perennials grow so fast that they need to be divided every year or two. Others will thrive for many years without spade-cuts.

See that each divided portion of perennials or shrubs has a generous amount of roots, as well as some healthy buds or top growth. Usually the most vigorous parts are the younger portions that form the outside of the old clumps.

You can split your shrubs with a sharp spade or a hatchet. A heavy knife is handy for perennial clumps; or they may be pulled apart with a pair of garden forks (back to back). Small clumps can be torn asunder with the hands.

Do not let the divisions dry out. Plant them promptly, and remember that roots need air as well as moisture. Therefore, keep the soil moist but not constantly saturated.



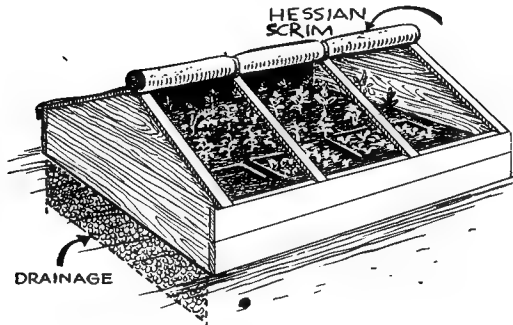
COLD-FRAMES AND HOT-BEDS FOR PROPAGATING PLANTS

You can widen your scope as a plant-grower by installing either a hot-bed or a cold-frame in your garden. It will enable you to successfully raise frost-tender seedlings for early planting out, and increase your chances of striking cuttings and raising young potted plants.

Cold-frames are enclosed plots of soil, usually fitted with hinged wooden frames, in which there are "lights" of glass. You

will find a cold-frame an excellent place to grow cuttings in shallow boxes (flats) containing sand.

PROPAGATION



A Cold-frame that you can easily make

Ventilation is important, but it must be properly controlled to ensure that there is no sudden inrush of a large volume of cold air. The sash may be opened just a little in the early morning and gradually opened wider as the day warms up. Close down

gradually in afternoon or evening. Full access of air is desirable when humidity is high.

There is no artificial heating in the cold-frame. If plants are grown in the soil, good drainage must be provided. Pots or boxes can rest on a bedding of ashes or sand.

USE GOOD STABLE MANURE FOR HOT-BED

If you decide on installing a heated structure, it may be a greenhouse, a frame warmed by electricity, steam or hot water, or a frame containing a hot-bed — soil warmed by electricity or fermenting manure.

Adequate means of effective ventilation must be provided, and screens of bagging or mats of straw provided for use on very cold nights or to give shade on hot days. These will provide additional insulation.

Choose a sheltered yet sunny site for your hot-bed, for cold, sweeping winds will be harmful. The inside temperature should not be allowed to build up rapidly or the plants will suffer.

To make a hot-bed, dig a pit 1 ft. to 2 ft. deep and 6 in. wide. Length should be a multiple of three to fit standard size frame-sashes. Fill pit with freshest possible horse manure that has not been exposed to

weather. Two parts solid excrement to one of litter is a good proportion.

To save heat, cover bottom of pit with several inches of straw or litter before putting in the manure.

Throw in the manure in successive layers of 5 to 6 in. Tramp firmly, particularly at corners and around edges. Allow for a settling of 3 to 6 in. A layer less than 6 in. will usually give poor results. Satisfactory depth is 12 to 18 in. Then place a 4 in. layer of good, friable soil (sand if for cuttings) on manure. Then have a 1 in. surface of fibrous compost. For the seed bed use 4 to 6 in. sifted loam or compost.

The hot-bed will heat vigorously for three days and temperature may go to 125° F. Then it will gradually cool to about 90°, after which you may begin your seed sowing.

ROOT CUTTINGS

Some trees and shrubs may be propagated by cutting off small pieces of their roots (2 to 3 inches long) and burying them in pots or boxes stood in a warm outside frame or indoors with a little bottom heat in early spring. Plants that propagate readily include bouvardias, sumachs, robina and *Daphne Genkiva*.

Grafting . . .

HOW TO GRAFT AND BUD YOUR FRUIT TREES

GRAFTING enables you to make a part of one plant unite with and grow upon the roots of another. For success the following conditions are essential:

1. The right time of the year when the sap is flowing.
2. Close contact between the cambium layer of stock and scion.
3. Skilful binding to retain close contact.
4. Covering to exclude air and water.

Grafting is chiefly used to propagate varieties and strains of woody plants that do not come true from seeds. Named varieties of fruit trees, nuts and ornamental plants are more or less propagated by grafting. The variety produced is the same as the "parent" plant (unless a rare "sport" occurs).

Stock means any plant part (usually root or stem) in which a bud or a scion is inserted to propagate a plant species, variety or strain.

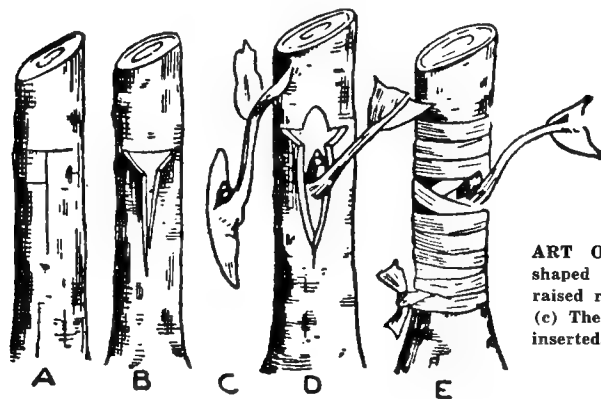
Scion means any plant part (usually of a stem) inserted in a stock for propagation. It may be one bud (with little or no wood) as in budding. Or it may be one or more buds (with one or more inter-nodes) as in grafting.

Cambium is the growing (cell-multiplying) part of a plant. It is a layer about the thinness of tissue paper which lies between the wood of the stem or the root and the bark. By bringing the cambium of the stock in close contact with that of the scion the two parts can be made to unite.

Importance of Cambium Layer

It is the slimy cambium layer that builds a new ring each year on the wood of the plant and adds another layer to the inner bark. It is the part of the stem that is really alive.

It is most active during early spring, when buds are expanding and leaves expanding. Activity again occurs usually soon



ART OF BUDDING: (a) T-shaped cut in stock. (b) Bark raised ready to receive the bud. (c) The prepared bud. (d) Bud inserted. (e) Bud tied in position.

GRAFTING

after midsummer (sometimes not until early autumn), depending on the amount of soil moisture. During these two periods plant wounds heal most rapidly and union between stock and scion is most certain.

In Victoria or Tableland zones stone fruits should be budded in January and February. Bud cherries and plums first, then apricots, peaches and almonds. Apples and pears are budded in February, March or April (according to season and locality).

Citrus can be budded in spring, summer or autumn. November, March and April are considered the best months.

Select Sturdy Growth-buds

Each scion must have at least one sturdy bud. Only well-developed buds from high-yielding trees should be used. Growth-buds can be distinguished by their flat or pointed appearance (blossom buds are larger and rounder).

Buds on new shoots of pome, cherry, walnut and citrus trees are single. This also applies generally to European plums. Buds on new wood of apricot, peach, almond and Japanese plum trees generally consist of one growth-bud and one or more blossom-buds, and are called multiple-buds.

Citrus buds should be chosen from rounded, mature, one-year-old wood about the thickness of a lead pencil. Do not use buds that have begun to grow.

On the stock make a cut $1\frac{1}{2}$ in. long and at right angles across the top make another cut (forming a "T"). Both cuts should penetrate to the wood beneath the bark. The corners of the flaps of bark may be raised by inserting the knife with a skidding action.

Cutting Bud from Bud-stick

When you cut the bud-stick from the "parent" tree, cut off the leaves to prevent loss of moisture. Leave a small part of each leaf-stalk attached. This will facilitate handling the bud and will protect it during insertion and tying.

Hold the bud-stick firmly by the thumb and first and second fingers of the left hand, the second finger supporting the bud-stick on the opposite side from the bud which is to be removed. The basal end of the bud-stick should point away from you.

The bud (with its shield of bark and wood) is then cut from the bud-stick. Begin about $\frac{1}{2}$ in. on the far side of the bud and finish about $\frac{1}{2}$ in. on the near side.

Cut just deeply enough to remove a thin slice of wood.

During cutting the right-hand thumb is pressed against the left-hand second finger. As the knife passes beneath the bud, the thumb of the left hand is brought down and holds the partly-severed bud against the bud-stick.

Remove Wood Very Carefully

An alternative method is to hold the bud-stick in the left hand, the first finger supporting it beneath the bud to be cut. The right-hand thumb is above the bud-stick just near the spot where the knife comes out from under the shield of bark.

By either method you should get a long, oval, shield-shaped piece of wood and bark with the bud attached. Remove the wood by gentle pressure on the sides of the bark (above the bud). To do this, hold the bud between the thumb and first finger and flick on the end of shield by a finger of the other hand.

If a small piece of wood remains on the bud, remove it carefully with the knife. Be sure not to injure the bud itself.

Sometimes when removing the wood from buds of some varieties of apricot (occasionally citrus, too) the central tissue of the bud itself pulls out. Such a bud will die. If it occurs often, cut a very thin shield and leave the wood in. Thinner shields than normal (with wood remaining) may also be used if bud-sticks of other kinds of fruit are not in good condition or the wood is difficult to remove.

How to Insert the Bud

Hold the bud between the thumb and forefinger and slip it carefully beneath the raised flaps of bark on the stock. The bud should lie along the wood with the bud itself projecting through the vertical cut of the "T." The bud must be right way up (leaf-stalk beneath the bud) and may be slipped along beneath the bark by using the leaf-stalk as a finger-grip.

If the bark of the bud overlaps the top-cut of the "T," sever the overlapping part so that the rest can lie closely against the cambium layer of the stock.

The inserted bud must be held firmly in position by careful tying or binding. This prevents the tissues drying out before union is complete and keeps water out of the wound.

Natural raffia in lengths of 15 in. form the most suitable material for tying. Thin

GRAFTING

strands are better than thick ones, and wet raffia should not be used. Firm tying is necessary. Do not draw the raffia across the points of the bud.

There are two methods of tying. In one, the raffia is held near the middle and both ends are wrapped simultaneously around the bud and the stock, beginning at the base of the cut and finishing above the top of the "T" with a reef knot.

In the second method, a single strand wrap is made by beginning at the bottom and overlapping one short end. The wrap is continued with the long, free end until the cut is covered. The free end is fastened with half-hitches.

Removing the Tie

Stock and scion usually have united about three weeks after budding. The tie can then be cut on the opposite side to the bud. If cutting of the tie is delayed too long, and the stock continues to grow, both bark and bud will be injured.

In Victoria, spring budding of deciduous trees is not practised extensively, being confined mostly to the stone fruits. It differs from dormant budding in that the bud-sticks are cut in late winter from the dormant tree and must be stored until the stock begins to grow.

The shield of wood in the bud cannot be removed easily. Therefore, it is necessary to cut a thin bud (with very little wood attached).

Citrus trees can be budded in exactly the same way as deciduous trees. However, frequently the "T" cut is inverted (with the horizontal cut at the bottom). The bud is then inserted from below and pushed up under the two flaps of bark. This method is claimed to be more successful if wet weather follows budding.

Treatment After Budding

Either dormant or spring budding may be used for citrus. For spring budding, the bud-sticks are cut from the growing tree just before use and are treated like bud-sticks in dormant budding. The shield of wood can be removed easily from the bud. Usually the bud is inserted near the base of a shoot, part of the shoot above the bud being removed to ensure that the bud will grow.

In summer and dormant budding of deciduous and citrus trees the stock is cut off just above the bud in late winter or early spring. In spring budding, remove top of the stock

6 in. above the bud at the time the raffia is cut. In both cases all shoots arising from the stock (other than the one from the bud) should be rubbed off before they reach 1 in. long.

Soon after the buds begin to grow, side growths will arise from the new shoot. Pull these off while small, care being taken not to remove leaves from the main shoot. About five of the later side growths (near the heading height) should be retained to form the head of the tree. The main shoot from the inserted bud should be allowed to extend until it is about 6 in. above the height at which it is desired to form the head or crotch. It should then be topped back to the side growths.

The 6 in. stub left above the spring bud is used to support the shoot. Support is needed because the tissues holding the bud to the stock are not yet strong enough to resist wind.

Grafting to Get New Varieties

In grafting, your aim is to cause the union of a scion (bearing several buds) with the stock of another tree. However, the principle is the same as that of inserting separate buds. There must be close contact between the cambium layers of both scion and stock.

In budding, it is preferable to bud on to young wood with thin bark. The age and size of the grafted part of the stock are immaterial in grafting, because of the many methods available.

"Re-working" means the changing of the variety of a tree by budding or grafting. Varieties eliminated are either of poor quality (therefore unpopular with the public) or their storage life is too short. And from time to time old varieties are displaced from favour by the introduction of new varieties with more desirable characteristics.

If the re-working entails the removal of most of the top part of a tree (stock) it is termed top-working. If all, or nearly all, of the branch system of the tree is retained, the method is called frame-working.

Advantages and Disadvantages

Advantages of top-working are that it is simple, quick, and the cost is small. It is a satisfactory method on pome fruit trees up to about eight years old, and for stone fruit and citrus trees up to any age.

However, old trees, after top-working, seldom attain their former size. Almost the entire framework of the tree has been lost and has to be regrown. In some varieties

GRAFTING

the crop is lost for at least five years, and the yield may never be as heavy as formerly. Quality of the fruit of top-worked apple, pear and citrus fruits may be inferior and have poor keeping qualities for years.

These disadvantages are largely overcome by frame-working. However, the initial cost of the work is higher, but this may be offset by earlier and heavier cropping of the trees and better quality of fruit. The method is not suitable for stone fruit trees.

Sometimes top-working and frame-working are combined. Thus large wounds are avoided by top-working the tree as high as possible and using frame-work grafts for the lower branches.

Frame-working Methods Described

In frame-working all, or nearly all, of the branches of the trees are retained in working. In Victoria it is used only for well-grown apple and pear trees more than eight years old.

Usually, scions about 5 in. long are placed at intervals of about 8 to 10 in. along the length of the limbs. A large supply of scion-wood must be available, for each tree needs from 50 to 200 or more grafts. The number depends on the size of the tree and the distance between each graft.

Begin grafting at the base of the limb and work upward. The operator should work above the graft and facing the butt of the tree.

PEG GRAFT (also known as plug or chisel graft): In peg grafting (scions look like rows of pegs stuck into tree limbs), chisel is driven into limb at an angle of 60 to 75°, at intervals of 8 to 10 inches on alternate sides of the limb. Depth of cut is at least half-inch. Scion is about $\frac{3}{8}$ in. in diameter and 5 in. long. Basal end is wedge-shaped, and a bud is retained near the shoulder of the wedge. The other end is cut straight across, about $\frac{1}{2}$ in. above top bud, to prevent this bud from being injured when scion is tapped into position with a mallet. Tying is unnecessary, but graft should be sealed.

BARK GRAFTS (scion inserted between bark and wood of stock): In the "L" bark-graft, an "L"-shaped cut is made at an angle of about 45° across the limb. Length of sides should be respectively $1\frac{1}{4}$ in. and

$\frac{1}{2}$ in. Raise the flap of bark and remove a short "V"-shaped piece of bark from below the base of the long arm of the "L." Space the cuts about 8 to 10 in. apart along each limb.

At the base of the scion a sloping cut about $1\frac{1}{2}$ in. long is made and a thin slice of bark is removed from the side of the wedge which will fit against the long arm of the "L" cut on the stock. Retain a bud about $\frac{1}{2}$ in. from the end of the scion.

Cut surface of the scion is inserted under the bark at the corner of the "L" cut so that it lies against the long arm of that cut and in the "V"-shaped groove.

"V"-BARK GRAFTING is simple and speedy. Two converging cuts, $\frac{1}{2}$ in. apart at broad end and not meeting at apex, are made on top side of limb. Bark is lifted (at broad end of "V") with knife. Or scion may be forced between bark and wood.

Scion is wedge-shaped (as in cleft grafting) and thin slices of bark are removed from the sides of the wedge. Wedge is pushed beneath "V"-shaped flap of bark, and edges of flap are trimmed. No tying is needed, as bark pressure holds scion in position. Seal immediately.

In **INVERTED "T" BARK-GRAFTING** the "T" cut (used in budding) is inverted. The longer cut, however, is made at an angle of 45° across limb. Bark flaps are lifted, and a small "V"-shaped piece of bark is removed from below the centre of the cross-cut. This cut looks like "T" to a spectator, but to operator, working above and facing in opposite way, really makes an inverted "T."

A sloping cut, $1\frac{1}{2}$ in. long, is made at base of scion, and a bud remains about $\frac{1}{2}$ in. from basal end. Scion is pushed under bark flaps, its sloping cut surface resting on the wood.

The **NEEDLE BARK-GRAFT** gets its name from needle-like tool used to pierce the bark. It is the quickest method of frame-work grafting. Hold needle at 30° angle above horizontal, and nearly at right angles to limb. Insert point through bark at top side of limb until wood resistance is felt. Lower needle to horizontal, thus raising bark.

Thin, wedge-shaped scion is used (thick scions split bark). Let needle remain in bark for use as lever until point of scion is inserted. Then withdraw needle and push

scion between the bark and the wood until wedge is just covered. No tying is needed. Seal immediately.

In **GOUGE BARK-GRAFTING** a $\frac{1}{4}$ in. gouge is used. It is one of the best and quickest frame-work grafts. A 1 in. cut is made at 60° across the bark. A piece of bark about the thickness of the scion is gouged on the near side and in the middle of the cut. This exposes the wood.

A thin, wedge-shaped 5 in. scion (one face longer than the other) is forced between the bark and the wood, so that the end of the longer face lies in the gouged hollow. No tying needed. Seal immediately.

STUB GRAFTS are made on shortened lateral growths arising from the main leaders. When the tree is poled, suitable lateral growths should be retained for stub-grafting and shortened back to 2 in. long. Scions make more vigorous growth on these stubs than peg and bark-graft scions do. Method of operation is similar to that of corresponding top-working graft, except that graft is made on 2 in. stub.

GRAFTING WAX: The most common recipe is 4 lb. resin, 2 lb. beeswax, and 1 lb. tallow. The three substances are melted together, mixed thoroughly, and while still hot poured into cold water.

When cool enough, the mixture is worked with greased hands until it becomes grained and light-coloured. Consistency of this wax can be varied to suit operator's requirements. Increasing the amount of tallow makes the wax softer, and increasing the amount of resin yields a harder wax.

The warmth of the hands may be sufficient to make this wax pliable enough for sealing the graft, or it may be necessary to warm it over hot water. When the wax is heated, care should be taken to ensure that the wax is not hot enough to injure plant tissue. Apply melted wax with a brush.

Another grafting wax is made by melting together 6 lb. resin, 10 lb. beeswax, and 4 lb. raw linseed oil, and then *slowly* adding 5 lb. honey. It is particularly important to add the honey slowly in small quantities, because the mixture froths and is liable to overflow the container and, if over the fire, ignite. It is safer to remove the mixture from the fire before adding the honey.

Special Types

Strap Graft

STRAP GRAFT (Part of scion is strap-like; when scion is inserted this strap spans cut surface of stock): For tree limbs over 1 in. in diameter strap graft is excellent top-working method. Wounds heal quickly. Used extensively for reworking apples and pears. Could be used also for cherries and plums. Begin grafting as soon as bark separates easily from wood of stock. Methods of preparing stock are:—

1. When stock diameter is 1 to 2 in. and only one scion is used, lengthwise cut (about 1 in. long) is made in bark at top of each side of limb. Raise flaps of bark with grafting knife.
2. When stock diameter is more than 2 in. and two scions are used, two lengthwise cuts ($\frac{1}{2}$ in. apart) are made on each side of limb, and bark is separated from wood.
3. When stock is similar to (2) but scions can be inserted without first cutting bark, lengthwise cuts are unnecessary. Prepared ends of scion are simply forced between bark and wood.

Shoot selected for scion should be 4 in. longer than stock diameter. To form strap, hold shoot with basal end pointing from you, and begin cut $1\frac{1}{2}$ in. below a basal bud. Cut resembles peeling operation and is made only deep enough to peel a thin slice of bark and wood 1 in. longer than stock diameter. Bend strap upward, but do not cut off. To remove the unwanted piece of scion-wood, make another cut sloping towards the basal end, and on opposite side from strap. This forms a wedge-shaped end about $\frac{3}{4}$ in. long. About $\frac{1}{2}$ in. of outside bark is removed from strap tip by a sloping cut.

If stock is prepared by either of first two methods named, insert end of strap between bark and wood on one side of stock where lengthwise cuts have been made. Place strap across cut surface and push wedge-shaped end of scion between bark and wood where lengthwise cut was made on opposite side of stock. Strap should lie as close as possible to stock. Bud near end of strap is either pushed under bark or remains exposed (on horizontal part of strap). Do not bend strap where a bud occurs, as it may break.

GRAFTING

If two scions are inserted, place them so that straps are parallel and close together (but reversed in direction). Tack or tie scion in position. Then seal whole graft. Cut ties about a month later, and provide some method of support for new growth.

Cleft Graft

(Cleft or split is made in stock.)

This graft, also known as wedge graft, is speedy and has been used in Victoria for pome fruits, peaches, cherries, and plums. Disadvantage is that large split allows wood-rotting fungi to enter wood, and provides a harbour for insect pests. Can be begun earlier in spring than bark grafts.

Make cleft 2 to 3 in. deep with splitter and mallet across centre of cut surface of stock (preferably where wood is straight-grained). Place wedge in cleft to keep it open until scion is inserted.

Scion-wood (5 in. long) should have three to six buds, depending on variety. Make basal end of scion wedge-shaped by two sloping cuts (each about $1\frac{1}{2}$ in. long). Retain bud on side of wedge. (If scion is broken accidentally, the bud will probably survive. Make wedge of scion a little thinner on inside edge, so that cambium layers will make close contact.

Insert scion at each end of cleft. Important that inside edges of barks should coincide. No tacking or tying needed. Thoroughly seal wounds.

Whip-tongue Graft

(Tongue-like projection is made by cuts in sloping faces of stock and scion.)

Highly satisfactory graft for stocks and scions of about same thickness and less than

1 in. in diameter. Used for apples, pears, plums, quinces, cherries, and apricots. Can be begun a few weeks before bark grafting.

Cut back stock by flat, sloping cut ($1\frac{1}{2}$ in. long). Make thin transverse cut ($\frac{1}{2}$ in. long) in opposite direction. Begin it at point about half-way down from top of sloping cut.

Scion is prepared similarly. Retain bud at back of scion ($\frac{1}{2}$ in. from end). Tongue-cut on scion should begin at point which corresponds to completion of tongue-cut on stock. Use waxed tape to hold and seal graft. Avoid side displacement when tying.

Bark Graft

(Scion is inserted between bark and wood.)

This simple, speedy graft is done most easily when bark of stock separates readily from wood. This occurs just after tree begins to grow. One or more lengthwise cuts (about 1 in. long) are made in bark at top of cut-off limb. For a limb 3 in. in diameter make two cuts, one on each side of cut surface. If you use wedge-shaped scion, it is not necessary to cut bark of stock.

Prepare scion by making sloping cut ($1\frac{1}{2}$ in. long) at basal end. Scion should have four or five buds (one at back of cut surface); or you can make scion wedge-shaped by a sloping cut on each side. Scion with single sloping cut is pushed down lengthwise cut on stock so that its surface is pressed against wood or stock. Wedge-shaped scion is forced between bark and wood. Push scion into stock until about $\frac{1}{4}$ in. of top of sloping cut on scion is above surface of stock.

Tack or tie scions with string or raffia. Then seal graft. When graft is well-callused, cut ties and provide supports for new growth.

★ See further methods of grafting in our Espalier Section,

Page 241.

PLANT IMPROVEMENT BY THE AMATEUR

The average gardener, although not able to experiment with colchicine, X-rays, distant hybridisation, etc., is quite capable of effecting a varietal improvement in any particular kind of garden plant provided the necessary techniques are known. One of the aims of a horticultural society is to encourage members to try and improve garden plants, particularly flowers. In fact, special sections are included to allow the exhibition of new seedlings developed locally.



BOUQUETS OF FLOWERING AND BERRY SHRUBS

No. 1—*Abelia longituba*

No. 3—*Kolkwitzia amabilis*

No. 5—*Viburnum Burkwoodii*

No. 2—*Leptospermum rotundifolium*

No. 4—*Prostanthera ovalifolia*

No. 6—*Cotoneaster serotina*

[Illustration by courtesy of Hodgins Nurseries Pty. Ltd., Essendon, Victoria]

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Grafting Affinities of Fruit Trees—

Existing Tree (Stock)	Scion	Remarks
APPLE <i>Pyrus malus</i>	Apple, all varieties Quince, all varieties Pear	Compatible Not used, probably unsatisfactory Unsatisfactory
PEAR <i>Pyrus communis</i>	Apple, all varieties Pear, all varieties Quince, all varieties	Unsatisfactory Satisfactory Not used, probably unsatisfactory
QUINCE <i>Cydonia vulgaris</i>	Apple, all varieties Pear Quince, all varieties Loquat, all varieties Medlar, all varieties	Not used, probably unsatisfactory Variable. Satisfactory varieties on this stock are Glou Morceau, B. Hardy, Doyenne du Comice, and Conference. Other pear varieties are decidedly dwarfed by quince. Satisfactory Satisfactory, slightly dwarfed Satisfactory, slightly dwarfed
PEACH and NECTARINE <i>Prunus Persica</i>	Peach, all varieties Nectarine, all varieties Almond, all varieties Apricot, all varieties European Plum Japanese Plum, all var.	Satisfactory Satisfactory Satisfactory Satisfactory King Billy, Angelina Burdett and Clyman are satisfactory varieties. Grand Duke, Diamond and President are sometimes satisfactory. Other varieties are untested. Satisfactory
PLUM, EUROPEAN <i>Prunus domestica</i>	Peach, all varieties Nectarine, all varieties Almond, all varieties Apricot, all varieties European Plum, all var. Japanese Plum, all var. Cherry, Sweet, all var.	Unsatisfactory Unsatisfactory Unsatisfactory Satisfactory Satisfactory Satisfactory Unsatisfactory
PLUM, JAPANESE <i>Prunus salicina</i>	Peach, all varieties Nectarine, all varieties Almond, all varieties Apricot, all varieties European Plum, all var. Japanese Plum, all var.	Unsatisfactory Unsatisfactory Unsatisfactory Unsatisfactory Unsatisfactory Satisfactory—results in other countries show that some are unsatisfactory.
CHERRY, SWEET <i>Prunus avium</i>	Cherry, Sweet, all var. Cherry, Sour, all var. Other kinds of fruit	Satisfactory Satisfactory Untested
CHERRY, SOUR <i>Prunus cerasus</i>	Cherry, Sweet, all var. Cherry, Sour, all var.	Satisfactory, dwarfing stock Satisfactory
APRICOT <i>Prunus Armeniaca</i>	Peach, all varieties Nectarine, all varieties Almond, all varieties Apricot, all varieties European Plum, all var. Japanese Plum, all var.	Unsatisfactory Unsatisfactory Unsatisfactory Satisfactory Unsatisfactory Unsatisfactory
ALMOND <i>Prunus amygdalus</i>	Peach, all varieties Nectarine, all varieties Almond, all varieties Apricot, all varieties European Plum, all var. Japanese Plum, all var.	Unsatisfactory Unsatisfactory Satisfactory Unsatisfactory Unsatisfactory, results variable Unsatisfactory
WALNUT <i>Juglans regia</i> (English) <i>J. Californica</i> , var. Hindsii <i>J. Californica</i> Paradox (hybrid) Royal (hybrid)	Walnut, <i>J. regia</i> , all var. Walnut, <i>J. regia</i> , all var. Walnut, <i>J. regia</i> , all var. Walnut, <i>J. regia</i> , all var. Walnut, <i>J. regia</i> , all var.	Satisfactory Satisfactory Satisfactory Satisfactory Satisfactory

How to take Cuttings . . .

AND GET THEM TO "STRIKE"

YOU can make cuttings from any plant part that has a primary tissue (meristem) and thus increase the number of your plants. Remember, cuttings (being a form of asexual propagation) reproduce the same variety as the "parent" plants from which they have been severed (except in the rare case of a "sport"). Cuttings may be made from roots, root-stocks (or rhizomes), tubers, stems, or even leaves. Softwood cuttings are usually known as "slips."

Many gardeners favour "heel cuttings" (pulled off with a "heel" of old wood adhering). Roses, lilacs, brooms, lavender and cypripedium can be treated in this manner. Cuttings from leaf-dropping plants are taken in autumn and evergreens in the spring.

Root Cuttings

Any plant species that naturally produces suckers (orange, red raspberry, horse radish, bouvardia, persimmon) may have root cuttings taken from it. Growth will come from adventitious buds, which develop after cutting is planted (roots have no true buds).

Select fat roots. Cut them into pieces 2 to 4 in. long. You can plant them outdoors in sandy soil, in cold frames, or in beds of peat-moss and sand indoors. If they are to be raised indoors, plant them immediately in the propagating bed. Keep them cool at first, then somewhat warmer after four to six weeks. Flats (or shallow boxes) filled with light sandy loam and leaf mould are used.

If cuttings are to be planted outside, store them until spring in peat-moss and sand in a temperature of about 40 deg. and then plant in frames or in garden.

Many cuttings root more quickly if treated with root-inducing hormones before planting.

Leaf Cuttings

New plants may be produced from cuttings of the fleshy leaves or thick petioles of certain plants (such as Rex begonia). Leaves may be cut into several triangular pieces, each of which has a large piece of one of the main veins of the leaf. If the pieces are placed half their depth into sand, the veins will callous and young plantlets

start. Contact with sand must be good, and moisture and temperature conditions right.

Sometimes the entire leaf of Rex begonia is used. Main veins are cut through at various points and the leaf pinned on the sand. Cut ends of veins must be in close contact with sand. A bell-jar should be placed over the leaves to prevent drying out.

Choose Young, Healthy Stems

SOFTWOOD CUTTINGS: Most softwood plants may be increased by greenwood cuttings. You can take cuttings not only from plants the tissues of which are relatively soft (chrysanthemum, carnation) but also from the soft tissues of those which become woody and which may also be propagated by hardwood or semi-hardwood cuttings (deutzia).

Tender tips of ornamental shrubbery and other hardwood plants may also be used for propagation, provided cuttings are taken when growth is most rapid and are planted immediately in well-drained, well-shaded sand-beds under glass.

Take softwood cuttings from vigorous, healthy plants. Choose stems that are brittle, not stringy. When bent, the stem should snap clean across. If it bends (or only partly breaks) it is too old. It might root, but very slowly. Best material for cutting is first 1 to 3 in. of tip of shoot. Terminal wood is full of vitality.

Two nodes should be used for each cutting — the more the better. Make cutting 2 to 5 in. long. Too long a cutting will be difficult to root and plant may be unshapely. Do not allow flower buds to remain on cutting or they will exhaust its vitality. In most cases it is customary to

TYPES FOR CUTTINGS

cut to a node, but this is not always necessary. Many softwooded plants can form roots from almost any point below ground (whether a node is there or not).

Take great care of softwood cuttings. Avoid intense sunlight. Provide shade until roots are formed. Press soil firmly round cuttings when planted. If there is a moderate amount of bottom heat, roots should form in 10 to 14 days.

Soft Green Cuttings

Abutilon	Linum
Arabis	Mahernia
Aubrietia	Malvaviscus
Boronia	Mesembryanthemum
Cactus	Pentstemon
Calceolaria	Petunia
Chrysanthemum	Phlox
Cytisus	Pimelea
Dahlia	Rehmania
Dianthus	Roehea
Erica	Salvia
Felicia	Scabiosa
Forsythia	Sedum
Fuchsia	Sophora
Gerbera	Sparmannia
Helianthemum	Streptosolen
Hibiscus	Tecoma
Hypericum	Verbena
Kerria	Veronica
Lantana	Viburnum
Leptospermum	Viola

Hardened Green Cuttings

Abelia	Ipomoea
Azalea	Jacaranda
Boronia	Jasminum
Bougainvillea	Lavandula
Camellia	Lavatera
Cassia	Leonotis
Chorizema	Mahonia
Cistus	Mahernia
Clerodendron	Mandevilla
Cytisus	Myrtus
Daphne	Nerium
Deutzia	Pelargonium
Diervilla	Pernetia
Escallonia	Rosa
Eugenia	Solandra
Forsythia	Solanum
Grevillea	Spiraea
Hibiscus	Stephanotis
Hoya	Syringa
Hydrangea	Tibouchina
Ilex	Trachelospermum

By taking a cutting from the "parent" plant, you cut it off from its water supply (roots). But its leaves continue to give out moisture. Avoid excessive loss of moisture (which is fatal to cutting) by planting cutting immediately. If that is not convenient, wrap cutting in moist newspaper.

Remove leaves from the part of the cutting that is to be buried. Maintain a moist atmosphere, but avoid draughts in greenhouse or cold frame. After roots have formed, gradually accustom young plants to normal air conditions. Sprinkle cuttings lightly with very fine spray of water once or twice a day, but never so late that they are wet when night falls.

Coarse sand (free from all organic matter) has proved to be the best material to root cuttings in. Sand gives good aeration and drainage and allows free passage of water out from below. Mixtures of peat-moss and sand (or pure peat-moss) are excellent rooting media.

Method for Hardwood Cuttings

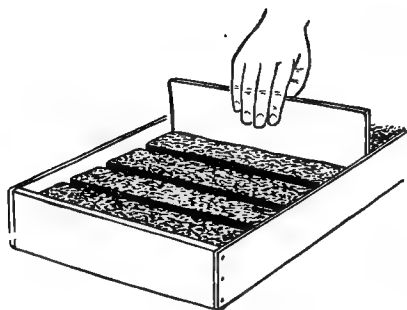
HARDWOOD CUTTINGS: Make your hardwood cuttings after the leaves fall. Select firm, strong shoots that have developed during the summer that has just passed. You will know them, as they are more supple and lighter in colour than the older shoots. Cut them into pieces each 10 to 12 in. long. Slice the base of each across horizontally, just beneath a node. Cut its top slantwise, just above a node.

Tie the prepared cuttings in bundles (their base all at one end). Bury the bundles in sand in a cold frame or outdoors. Let them rest either horizontally or with bases upwards. Cover with sand to depth of 6 to 8 in. Later, throw a layer of leaves over the surface to protect soil from cold weather.

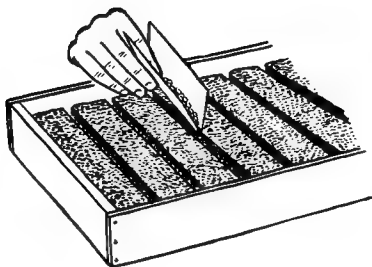
In spring, before tree-buds open, dig up your cuttings and plant them in rows far enough apart for cultivation. Plant them so that each one has one or two nodes above soil surface.

Climbing roses, currants, grapes, Forsythia, Deutzia, Spiraea and Privet are easy to propagate from hardwood cuttings.

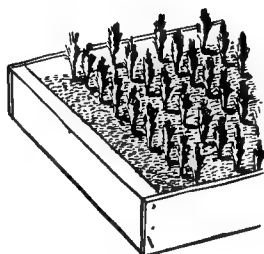
TUBER CUTTINGS: Potato tubers are usually cut in pieces, each containing at least one eye or bud. When planted, a shoot forms from the eye and grows through the soil to air and light. Roots then begin to form near the base of the shoot. The new plant, even though its roots can now obtain food, continues to draw on the food stored in the tuber.



1: Make drills in seed box.



2: Sow seeds lightly.



3: Thin out plants for maximum development.

Flowers for Beauty...

The trend of today's gardens is towards the informal, which tends to use curves rather than straight lines, and informal plantings of naturally-shaped trees and shrubs rather than the reverse. This is accentuated by the use of mixed shrubberies and herbaceous perennial borders which not only provide interest in the garden at all times of the year but are easy to maintain. This mixing of formal and informal styles is a major pitfall. By choosing the informal style and applying careful planning, the home gardener will save himself much labour in maintenance and the garden will have points of interest throughout the year.

ANNUALS

The name annuals is given to a group of flowers which grow from seed to flower within one year. The term also covers some biennials and perennials which are grown as annuals.

Annuals may be divided into three types—hardy, half-hardy, and tender. The hardy group requires no protection from the cold.

The half-hardy are those raised with protection and then planted out after the frosts or their sowing delayed until that time. Tender annuals usually require artificial heat and shelter during the growing season.

Most annuals are free-flowering, providing a wide range of colour and form. They come to flower quickly and bloom over a long period. They are useful for massed colour effects and for a change of colour scheme in the garden. Many make excellent cut flowers. Their disadvantage is that they require planting and replanting throughout the year.

With few exceptions, all annuals thrive in a moderately rich, well-drained loam, and an open, sunny position protected from wind. They are raised from seed either sown in seed beds or boxes, and later transplanted. In the case of the larger seeded species, e.g., sunflower, they may be sown directly into their position and later thinned out. Adequate precautions should be taken to protect young plants from the ravages of snails and slugs.

FLOWERS FOR BEAUTY

PERENNIALS

The more correct term, herbaceous perennials, distinguishes these plants from bulbs and other perennial types of plant. They make annual growth on perennial roots, growing through spring, summer and autumn, dying down, and reappearing in spring.

The easiest and probably the best way to grow them is in an herbaceous border—a border or bed planned to give the maximum amount of colour over the year. In the planning which is essential for this border, care must be taken to consider the height, colour and season of bloom of each species planted. The best aspect is facing the east or north-east, but with care in selection a border can be grown in practically any aspect, except due south.

Planting should allow space for the development of clumps. The spaces may be

filled in with annuals and biennials for the first year or so, but bulbs should not be so used, as most of them become overgrown, lost, or injured in forking. Shrubs also are unsuitable, but some plants such as iris may be included with good results.

An herbaceous border offers an easy way of obtaining flowers with a minimum of effort. If the soil is well-prepared by trenching and incorporating well-rotted manure to make it moderately rich, and well-drained, the maintenance of the border presents little difficulty once it is planted. The border will require to be watered sufficiently. It will require to be mulched annually with old manure or compost, to be forked over annually, weeded when necessary, and the clumps cut back in winter.

As a general rule, clumps can be lifted and divided at any time after flowering until early spring.

★ Sowing Time Table . . .

FLOWER PLANTING

MONTH by MONTH

This time-table shows when every popular flower may be sown, and what you can sow in any given month.

Sowing times are correct for temperate zones, but in exceptionally hot or cold climates allow for sowing a few weeks earlier or later.

The secret of success is in proper preparation. Especially during the hotter months keep the soil moist, but well drained; it should be light, fine, and porous. Protect from strong winds or direct summer sun.

Sow small seeds covered with about their own depth of soil, and larger seeds about twice their own depth. *Don't allow the soil to dry out.*

Our information is by courtesy of Anderson Seeds.

[The black squares indicate the planting month.]

FLOWERS	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
Acroclinium												
Afrn. Gdn Daisy												
Ageratum												
Alyssum												
Amaranthus												
Anchusa												
Anemone												
Antirrhinum												
Aquilegia												
Arctotis												
Aster												
Aubretia												
Bilam												
Begonia												
Begonia (Tuber)												
Bellis Perennis												
Blue Lace Flower												
Baronia, Brown												
Brachycome												
Calendula												
Californ. Poppy												
Calliopis												
Camomile												
Candytuft												
Canna												
Cent. Bells (Ann.)												
Cent. Bells (Per.)												
Cosmicum (Ora.)												
Cornation												
Celtis												
Centaurea												
Cherry Pie												
Chrysanth. (Ann.)												
Chrysanth. (Per.)												
Cineraria												
Clarkia												
Cleome												
Cockscomb												
Coleus												
Columbine												
Convolvus												
Cornflower												
Cosmos												
Cup Flower												
Cuphea												

SOWING TIME TABLES

FLOWERS	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
Cynoglossum												
Dahlia												
Delphinium												
Dianthus												
Didiscus												
Dimorphotheca												
Double Daisy												
Dwl. Morn. Glory												
English Marigold												
Eschscholzia												
Flame of Fire												
Forget-me-not												
foxglove												
Freesia												
Gaillardia												
Gerbera												
Ocum												
Cladialus												
Globe Amaranth												
Gadalia												
Golden Feather												
Gomphrena												
Grasses, Ornml												
Cryptantha												
Helianthus												
Helichrysum												
Heliotrope												
Heuchera												
Hollyhack												
Hunemannia												
Iceland Poppy												
Impatiens												
Ipomopsis												
Kochia												
Larkspur												
Lathyrus												
Lavender Shower												
Leptostem												
Linaria												
Lobelia												
Love-in-a-Mist												
Lupin												
Marigold, African												
Marigold, French												
Mathiola												
Matricaria												
Mesembryanthm												
Mexican Poppy												
Mexcn Sunflower												
Mignonne												
Mimulus												
Mina Lobata												
Monkey Flower												
Nasturtium												
Nemesia												
Nemophila												

FLOWERS	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
Nepeta												
Nierembergia												
Nigella												
Night-Scnd. Silk												
Pansy												
Pastillara												
Pentstemon												
Perennial Pea												
Petunia												
Phacelia												
Phlox												
Pin Cushion												
Platycodon												
Polyanthus												
Pomegranate												
Paar Man's Orchid												
Poppy, California												
Poppy, Iceland												
Poppy, Mexican												
Poppy, Shirley												
Portulaca												
Primula												
Prim. Malacoides												
Pyrethrum												
Ranunculus												
Rhodantha												
Rudbeckia												
Salpiglossis												
Salvia												
Saponaria												
Scabiosa												
Schizanthus												
Sesbania												
Snapdragon												
Statice												
Stock												
Straw Flower												
Sturt's Desert Pea												
Summer Cypress												
Sunflower												
Swan River Daisy												
Sweet Pea												
Sweet William												
Sweet Wivelsfield												
Thalictrum												
Tithonia												
Torenia												
Ursinia												
Venidium												
Verbena												
Viola												
Virginian Stock												
Viscaria												
Wallflower												
Yel. Marquerite												
Zinnia												



What Type of Garden are You Planning?

There are many distinct types of individual gardens. These may form part of the whole garden or even occupy it completely. There are sun gardens which utilise sun-loving plants, and shade gardens which include those plants appreciating various degrees of shade; there are herb gardens, water gardens, and so on. In fact, there are many kinds of gardens which can be combined in the design of a complete garden scheme. The planner should decide what types of gardens he wishes to include in the whole. He should consider the lawn space he will require and whether it is intended for recreation, relaxation, or ornament. He should consider the amount of time it is intended to give to the garden weekly and plan accordingly. Lawns and annuals require constant treatment, whereas perennials and shrubs need less attention.

SWEET-SCENTED FLOWERS

Annuals

Alyssum (Sweet Alice)	Petunias
Antirrhinum (Snapdragon) (slightly)	Phlox (slightly)
Carnations	Scabious (Pincushion)
Centaurea (Sweet Sultan)	Sweet Peas
Dianthus (Pinks, Sweet Williams)	Stocks
Nicotiana	Wallflowers

Perennials

(S, Shrub; H.P., Herbaceous Perennial; Cl., Climber))

Akebia, Cl.	Jasmine (white and pink), Cl.
Acokanthera, S.	Kolkwitzia (Chinese Beauty Bush), S.
Boronia megastigma (Brown Boronia), S.	Lavender, H.P.
Bouvardia, S.	Lilac, S.
Carpenteria, S.	Luculia, Cl.
Clerodendron, S.	Mandevilla, Cl.
Corylopsis, S.	Magnolia glauca, S.
Centranthus (Kiss-Me-Quick), H.P.	Michaelia fuscata (Port-wine Magnolia), S.
Daphne, S.	Pittosporum, S.
Frangipanni, S.	Rhododendron fragrantissima, S.
Gardenia, S.	Rhynchospermum, Cl.
Lipia (Lemon-scented Verbena), S.	Rosemary, H.P.
Peony (called "Tree Peony"), H.P.	Verbena, H.P.
Prostanthera (Mint Bush).	Viburnum, S.
Gelsemium, Cl.	Violet, H.P.
Honeysuckle, Cl.	Wistaria, Cl.

Roses

(S. and Cl. Varieties)

Cloth of Gold	Mrs. Bryce Allan
Charlotte Armstrong	Nocturne
Comrade	Orange Nassau
Crimson Glory	Ophelia
Daily Mail Scented	Panorama
Dusky Maiden	Picture
Etoile de Hollande	Radiance
Elinor de Grice	Rose Marie
Forty-niner	Red Ensign
Gen. McArthur	Rouge Mallerin
Hadley	San Fernando
Heart's Desire	Shot Silk
Julie Stahl	Snow White
Mabel Francis	Tassin
Madame Butterfly	William Harvey
Mirandy	William Orr
Mrs. Lennon	All moss roses

Bulbs

Allium (strong)	Lilium candidum (Madonna)
Belladonna (strong)	Lilium Famosanum
Fréesia	Lilium Hansonii
Hyacinth	Lilium Longiflorum
Jonquil	Lilium regale
Lilium auratum	Lily of the Valley
Lilium Brownii	Tuberose

Trees

Acacia (Wattle)	Citrus (Lemon, Orange, etc.)
False Acacia	Magnolia grandiflora
Buddleia	



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Top illustration: 12-inch Master Lightweight Power Mower.
Second illustration: 12 and 14-inch Electric Mower.
Third illustration: 14 and 16-inch Zephyr.

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FLOWERS FOR SUNNY POSITIONS

(Note: Some of these also do well in semi-shade. See separate list.)

Annuals

African Marigold
Ageratum (Floss-flower)
Alyssum (Sweet Alice)
Anchusa (Forget-me-not)
Antirrhinum (Snapdragon)
Aster
Calendula (English Marigold)
Celosia (Coxcomb; Prince of Wales
Feather)
Centaurea (Sweet Sultan)
Clarkia
Cornflower
Cosmos
Dimorphotheca (Star of the Veldt)
Escholtzia (Californian Poppy)
French Marigold
Gaillardia
Gazania
Globe Amaranth
Helychrisum (Everlasting)
Hollyhock
Iberis (Candytuft)

Iceland Poppy
Larkspur
Linaria
Mesembryanthemum (Stone-flower)
Mignonette
Mimulus (Monkey-musk)
Nasturtium
Nemesia
Nigella (Love-in-a-mist)
Petunia
Portulaca (Pig's-face)
Salpiglossis.
Schizanthus (Poor Man's Orchid)
Scabious (Pincushion)
Stock
Sunflower
Sweet Pea
Torenia
Viscaria
Wallflower
Zinnia

Herbaceous Perennials

Campanula (Canterbury Bells)
Carnation
Centranthus (Kiss-me-quick)
Chrysanthemum
Cleome (Spider Flower)
Delphinium
Dianthus (Pinks)
Dielytra (Bleeding Heart)
Eryngium (Sea Holly)
Geranium
Gypsophila
Lavender
Lupin
Lychnis

Nierembergia (Cup Flower)
Othonna
Pentstemon (Beard-tongue)
Perennial Aster (Michaelmas and Easter
Daisies)
Perennial Hollyhock
Perennial Phlox
Perennial Scabious (Pincushion)
Perennial Wallflower
Physostegia (Dragon's Head)
Salvia
Saxifraga (Rockfoil)
Statice (Sea Lavender)
Violet

Bulbs

Agapanthus
Alstromeria (Peruvian Lily)
Anemone
Babiana
Calla
Canna
Daffodil
Dahlia
Freesia
Gladiolus
Hyacinth
Iris

Ixia
Jonquil
Kniphofia (Red-hot Poker)
Lachenalia
Montbretia
Nerine
Ranunculus
Sparaxis
Tuberose
Tritonia
Tulip
Watsonia

FLOWERS FOR SEMI-SHADE

(Note: Some of these will also do well in full sun. See separate list.)

Annuals

Ageratum (Floss Flower)
Alyssum (Sweet Alice)
Anchusa
Antirrhinum (Snapdragon)
Aster (Perennial variety)
Balsam
Clarkia
Godetia
Gypsophila
Hollyhock
Linaria (Toad-flax)

Lobelia
Nasturtium
Nigella (Love-in-a-mist)
Pansy
Petunia
Phlox
Salpiglossis
Torenia
Viola
Viscaria

Herbaceous Perennials

Aconitum (Monk's Hood)
Anemone Japonica
Aquilegia (Columbine)
Campanula (Canterbury Bells)
Centranthus (Kiss-me-quick)
Cimicifuga (Bug-bane)
Geranium
Gerbera
Helleborus (Xmas Rose)

Lunaria (Honesty)
Peony
Polyanthus
Primrose
Primula
Perennial Gypsophila
Perennial Hollyhock
Perennial Phlox
Saxifraga (Rockfoil)

Bulbs

Amaryllis (Belladonna Lily)
Clivia
Convallaria (Lily of the Valley)
Crocus
Daffodil
Hippeastrum
Kniphofia (Red-hot Poker)

Liliums
Petticoat Narcissus
Polygonatum (Solomon's Seal)
Snowflakes and Snowdrops
Sprekelia (Japanese Blood Lily)
Vallota

FLOWERS FOR SHADY POSITIONS

Annuals

Ageratum (Floss Flower)
Alyssum (Sweet Alice)
Anchusa (Forget-me-not)
Cineraria
Foxglove
Ferns
Linaria

Lobelia
Ann. Lupin
Matricaria
Nasturtium
Nigella (Love-in-a-mist)
Salpiglossis

Herbaceous Perennials

Aquilegia (Columbine)
Campanula (Canterbury Bells)
Doronicum (Leopard's Bane)
Gerbera (Barbiton Daisy)
Geum

Helleborus (Xmas Rose)
Heucera (Coral Flower)
Lavender Shower
Peony
Primula
Saxifrage

Bulbs

Begonia
Convallaria (Lily of the Valley)
Crocus
Daffodils

Lilium
Polygonatum (Solomon's Seal)
Snowflakes
Snowdrops

BEST-LASTING CUT FLOWERS

Annuals

Antirrhinum (Snapdragon)	Larkspur
Aster	Marigold (French and African)
Calendula (English Marigold)	Mignonette
Centaurea (Sweet William)	Nigella (Love-in-a-mist)
Coreopsis	Rudbeckia
Clarkia	Scabious (Pincushion)
Gaillardia	Statice (Sea Lavender; Everlasting)
Globe Amaranth (Everlasting)	Stocks
Gypsophila	Sweet Peas
Helychrisum (Everlasting)	Wallflowers
Iberis (Candytuft)	Zinnia
Iceland Poppy	

Perennials

Perennial Asters	Grevilleas (Spider Flower, Toothbrush Flower, etc.)
Brooms (Genista, Cytisus, etc.)	Hydrangea
Calistemon and Melaleuca (Bottlebrush).	Perennial Iberis (Candytuft)
Carnation, Dianthus (Sweet William, etc.)	Lagerstroemia (Crepe Myrtle)
Chrysanthemum	Lupins (Russell var.)
Perennial Centaurea (Sweet Sultan)	Pentstemon
Camellia	Polyanthus and Primrose
Daphne	Protea
Daisies (Felicia, Marguerites, Gerberas, etc.)	Shasta Daisy
Delphinium	Statice (Everlasting)
Erica and Epacris	Perennial Scabious (Pincushion)
	Syringa (Lilac)

Bulbs

Agapanthus	Ixia
Amaryllis (Belladonna)	Jonquil
Alstromeria (Peruvian Lily)	Kniphofia (Red-hot Poker)
Convallaria (Lily of the Valley)	Liliums
Daffodil	Montbretia
Freesia	Nerine (Spider Lily)
Gladiolus	Ranunculus
Hyacinth	Sparaxis
Iris Stylosa	Watsonia

CUT FLOWERS WILL LAST LONGER

- (1) If cut in early morning or in evening and placed up to their necks in a bucket of water for several hours before arranging.
- (2) If all leaves below water-line are removed.
- (3) If water is changed daily and a little of flower stem snipped off. (Exception: Carnations, which revel in dirty water.) Add a small piece of charcoal to absorb slime and odour.
- (4) If those with woody stems have the bottom two or three inches of stem crushed, e.g., chrysanthemums, lilac, hydrangeas. Hydrangeas can be completely revived by immersing them, flower heads and all, in a trough of water overnight.
- (5) If poppies have their ends singed, and dahlia stems are placed in very hot water and left until it cools.
- (6) If picked in bud stage—especially irises, roses, poppies (poppy buds must be erect).
- (7) If those with a sappy nature, e.g., daffodils, jonquils, ranunculus, tulips, which bleed and clot, have their stems freshly cut *immediately* before placing in vases.
- (8) If a few grains of Condyl's Crystals, a pinch of carb. soda, or a dissolved aspirin tablet is added to the water.

HOW HIGH IS THIS FLOWER ?

Small Varieties, approximately 6 in. to 9 in. in height

Ageratum (Dwarf) (Floss Flower)	Mignonette
Alyssum (Sweet Alice)	Mimulus (Monkey Musk)
Anemone	Nasturtium (Tom Thumb variety)
Babiana	Nemesia (Dwarf and Blue Cap varieties)
Begonia (small bedding variety)	Nierembergia (Cup Flower)
Bellis Perennis (English Daisy)	Pansy
Brachycombe (Swan River Daisy)	Phlox (Dwarf variety)
Bulbocodium (Petticoat Narcissus)	Polyanthus
Convallaria (Lily of the Valley)	Portulaca
Crocus	Primrose
Dianthus (Pinks)	Primula
Freesia	Stock (Virginian)
French Marigold	Tritonia crocata
Hyacinth	Tulip
Iris Stylosa	Verbena
Lachenalia	Viola
Lobelia	Zinnia Haageana (Dwarf variety)
Mesembryanthemum	Zinnia Linearis (Dwarf variety)

Approx. 12 in. to 18 in. tall

Aconitum (Monk's Hood)	Jonquil
Antirrhinum (Dwarf variety)	Lavender
Aquilegia (Columbine)	Linaria
Calla	Myosotis (Forget-me-not)
Calendula (English Marigold)	Nemesia
Carnation	Nerine (Spider Lily)
Celosia (Coxcomb)	Nigella (Love-in-a-mist)
Centaurea (Candytuft)	Petunia
Cineraria	Peony
Clarkia	Phlox Drummondii
Clivia	Saxifrage (Rockfoil)
Daffodil	Snowdrop
Delphinium (Butterfly variety)	Snowflake
Dianthus (Sweet William variety)	Sparaxis
Dimorphotheca (Star of the Veldt; Cape Marigold)	Sprekelia (Japanese Blood Lily)
Gaillardia	Torenia
Globe Amaranth	Tuberosa
Heucera	Vallota
Iceland Poppy	Viscaria
Ixia	Wallflower (annual varieties)

Growing to about 2 ft. to 3 ft.

Agapanthus	Centranthus (Kiss-me-quick)
Alstromeria (Peruvian Lily)	Cimicifuga (Bug-bane)
Amaranthus plumosa (P. of Wales Feather)	Cleome (Spider Flower)
Amaranthus tricolour (Joseph's Coat)	Didiscus (Lace Flower)
Amaryllis (Belladonna)	Eryngium (Sea Holly)
Anemone Japonica	Geranium
Antirrhinum (Snapdragon)	Gerbera
Arctotis (African Daisy)	Gladiolus
Azalea	Gypsophila
Broom	Iris (Dutch and English varieties)
Campanula (Canterbury Bell)	Larkspur

HOW HIGH IS THIS FLOWER ?

Growing to About 2 ft. to 3 ft. — Continued

Lavender
Leptosyne (Winter Marguerite)
Lupin (Russell variety)
Lychnis
Montbretia
Nicotiana (Tobacco Plant)
Pentstemon
Physostegia (Dragon's Head)
Rhododendrons

Salvia Splendens (Bonfire S.)
Salvia farinacea
Salvia barbata
Salpiglossis
Scabiosa (Pincushion)
Schizanthus
Veronica
Watsonia
Wallflower (Perennial varieties)

Reaching approximately 4 ft. high

Aster (Perennial varieties)
Chrysanthemum
Cosmos
Dahlia
Doronicum (Leopard's Bane)
Foxglove
Iris Germanica

Kniphofia (Red-hot Poker)
Liliums
Marigold (African variety)
Othonna
Phlox (Perennial variety)
Scabious (Pincushion) (Perennial variety)

Some Flowers over 4 ft. high

(See also lists under Shrubs)

Berberis
Canna
Delphinium
Hollyhock
Japonica
Marigold (Tree variety)

Nasturtium (Climbing variety)
Olearia
Sunflower
Sweet Pea
Tithonia (Mexican Sunflower)
Viburnum

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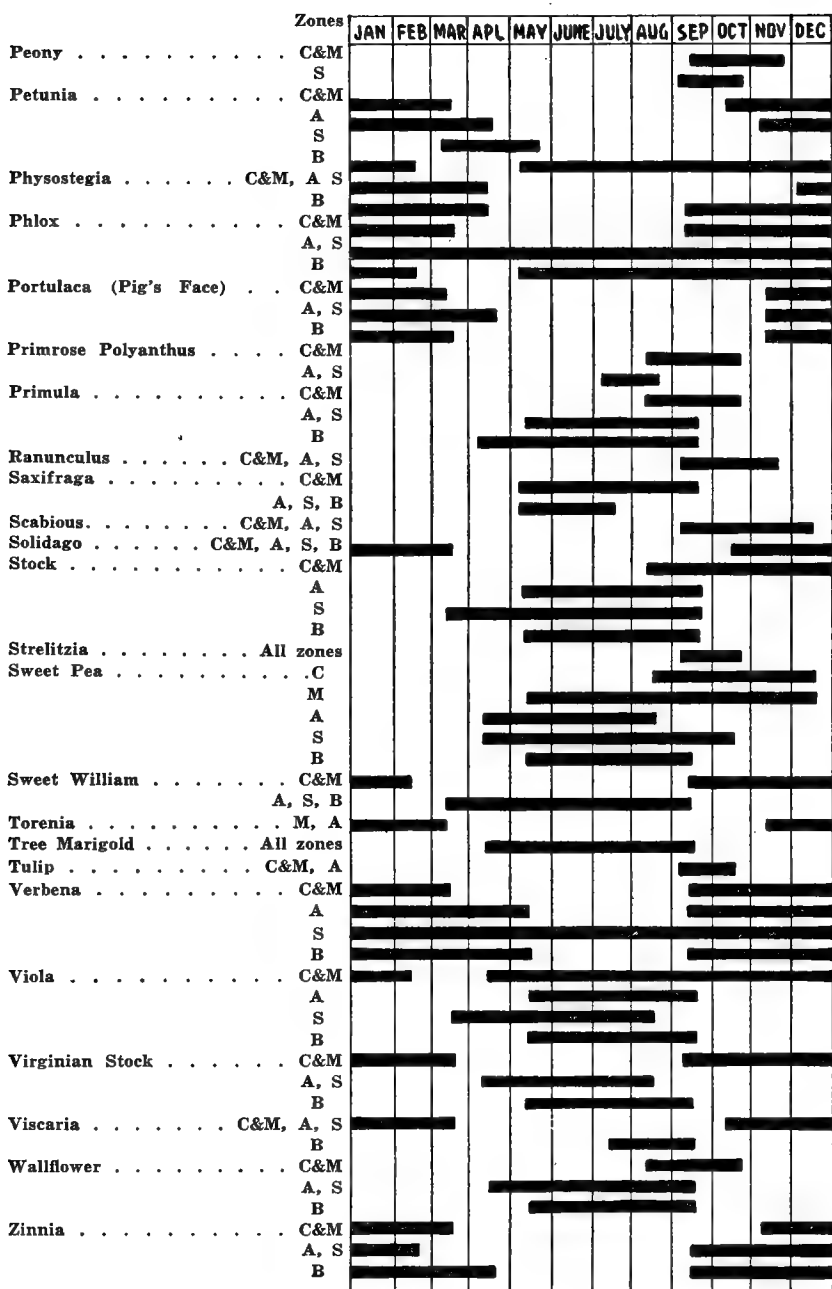
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Flowering Periods . . .

When will it bloom? That is the most important question in gardening, and here is the first attempt to tabulate our findings for annuals and perennials. Unfortunately, we cannot anticipate to the exact week because of factors such as sunny or shady position, fertility of soil, moisture content, early or late climatic seasons, etc. We have attempted to show how the different climatic zones affect blooming periods. (See map in first chapter.)

A equals Adelaide type of climate; B, Brisbane, semi-tropical; C, Canberra and Tablelands; M, Melbourne and Cool Southern; S, Sydney, temperate zone.

[illegible]



These charts represent an average period that blooms may be expected in the corresponding climatic zone. Allowances must be made for fluctuations in seasons and whether early or late flowering varieties are sown, etc. For key to letters, see first chart.



PERENNIAL ASTERS OR MICHAELMAS DAISIES

- | | | |
|-----------------------|------------------------------|-----------------------------|
| No. 1—Chas. Wilson | No. 6—Strawberries and Cream | No. 11—Mount Everest |
| No. 2—Victor | No. 7—Taplow Spire | No. 12—Empress of Colwall |
| No. 3—Spire | No. 8—Mammoth. | No. 13—Beechwood Challenger |
| No. 4—Sunset Glow | No. 9—Silver Spray | No. 14—Queen Mary |
| No. 5—Mrs. Geo. Monro | No. 10—Owen Wells | No. 15—Marjorie |

[Illustration by courtesy of Hodgins Nurseries Pty. Ltd., Essendon, Victoria]

Robinsons



Exclusive Seeds



★

There are several ways to improve the size of chrysanthemums. Nip the side buds or simply take out the centre bud of each clump.

Chrysanthemum Culture

Cuttings of all types can be rooted during early winter. Choose stout young shoots arising from round the base of the old plants and insert in pots or boxes of sandy soil. Place in a cool greenhouse or frame, shade for a few days, and when rooted pot up singly into three-inch pots. As soon as the plants have a hold of the soil, the pots should be stood out in a sheltered frame. The chrysanthemum is a hardy plant and resents being coddled.

Towards the end of September most of the plants will have formed a natural break, that is an immature flower bud appears but never develops and the plants commence to send out side shoots. If this does not occur by mid-November, the tops of the plants should be pinched out, and three side shoots permitted to grow. Keep the plants well staked, and in December repot into their final pots, usually 9-inch size or half petrol tins. This final potting should be into turfy compost rammed firmly into position. Still keep the plants outside in full sunshine. Each plant will by now have three strong stems, each stem requiring its own stake.

By the end of summer there appears on the top of each stem a flower bud. This is termed the first crown bud and being too early is rubbed out. From near the base of the first crown bud will arise several shoots. These should be reduced to

one on each stem. This as it grows becomes known as the second crown bud. If the variety is one that does best on a second crown bud it will become necessary to secure or "take the bud." This is done by removing very carefully the cluster of small shoots round its base and thereafter keeping all other side shoots from growing. Where a second crown bud is damaged it may be removed and the plant will send out a shoot on which a further bud known as the terminal bud, beyond which no further buds or growths are obtained.

With decorative varieties the same principle of stopping and disbudding applies except that more shoots are grown per plant both from the first and the second stopping.

For mildew, spray with 1 ounce of sulphide of potassium to 4 gallons of water. For green-fly apply Derris dust, and for rust spray the under sides of the leaves with weak Bordeaux mixture.

CASCADE CHRYSANTHEMUMS. These are not a special type but merely small flowered single varieties carefully trained into a drooping position. When once the plants have been potted into eight or nine-inch pots the shoots, several per plant, are trained to stakes or wires sloping at an angle of 45 deg. and in a southerly direction.

COLOURS OF FLOWERS (not including Shrubs)

ANNUALS

	White	Yellow	Orange	Brown	Red	Pink	Blue	Lilac Mauve Purple Violet
Alyssum (Sweet Alice)	*	*					*	
Ageratum (Floss Flower)							*	
African Marigold		*	*					
Anchusa (Forget-me-not)							*	
Antirrhinum (Snapdragon)	*	*	*	*	*	*		
Aster	*				*	*	*	*
Balsam	*	*		*	*			
Calendula (Eng. Marigold)		*	*					
Celosia (Coxcomb, P. Wales Fthr.)		*	*	*	*	*		
Centaurea (Sweet Sultan)	*	*				*		*
Cineraria	*				*	*	*	*
Clarkia			*		*	*		*
Cornflower	*					*	*	
Cosmos	*		*		*	*		
Dimorphanthera (Star of the Veldt)	*		*		*	*		
Escholtzia (Californian Poppy) . . .		*	*		*			*
French Marigold		*	*	*				
Gaillardia		*	*	*	*			
Gazania		*	*	*	*			*
Globe Amaranth		*	*			*		*
Godetia					*	*		*
Gypsophila	*							
Helychrisum (Everlasting)	*	*	*	*	*	*		*
Hollyhock	*				*	*		*
Iberis (Candytuft)	*				*	*		*
Iceland Poppy	*	*	*		*			
Linaria (Land-flax)	*	*	*		*	*		*
Larkspur					*	*	*	
Lobelia							*	
Lupin	*					*	*	*
Matricaria		*						
Mesembryanthemum		*	*	*	*	*		*
Mimulus		*	*	*				
Nasturtium		*	*	*	*	*		
Nigella							*	
Pansy		*	*	*	*		*	*
Petunia					*	*	*	*
Phlox	*	*	*	*	*	*		*
Portulaca	*	*	*	*	*	*		*
Salpiglossis		*	*	*	*		*	*
Schizanthus		*	*	*	*	*		*
Scabious	*				*	*		*
Stock	*				*	*		*
Sunflower		*	*					
Sweet Pea	*				*	*		*
Torenia		*			*		*	*
Viola		*	*		*		*	*
Viscaria	*				*	*	*	*
Wallflower		*	*	*	*			*
Zinnia	*	*	*	*	*	*		*

COLOURS OF FLOWERS

HERBACEOUS PERENNIALS

	White	Yellow	Orange	Brown	Pink	Light	Violet Red		Blue	Mauve Purple
Aconitum (Monk's Head)								*		
Anemone Japonica	*				*		*			*
Aquilegia (Columbine)		*								*
Campanula (Canterbury Bell)	*						*			*
Carnation	*	*			*		*			*
Centranthus (Kiss-me-quick)					*					
Chrysanthemum	*	*	*	*	*		*			*
Cimicifuga (Bug-bane)	*									
Cleome (Spider Flower)	*	*								
Delphinium	*						*	*		*
Dianthus (Pinks)	*				*		*			*
Dielytra (Bleeding Heart)	*	*								
Doronicum (Leopards Bane)		*								
Eryngium (Sea Holly)	*							*		
Geranium	*				*		*			*
Gerbera (Bankston Daisy)		*	*				*			
Gypsophila	*						*			
Heleborus (Xmas Rose)	*				*		*			*
Heucera (Coral Flower)					*		*			*
Lavender										*
Lavender Shower										*
Linaria	*									*
Lychnis	*				*		*			*
Nierembergia (Cap Flower)	*									*
Othonna		*								
Pentstemon (Beard-tongue)	*	*					*	*		*
Perennial Aster	*				*		*			*
Perennial Hollyhock	*				*		*			*
Perennial Phlox	*				*		*			*
Perennial Scabious	*				*		*			*
Perennial Wallflower		*	*	*	*		*			*
Perennial Gypsophila	*						*			
Peony	*				*					*
Polyanthus		*	*	*	*			*		*
Primrose	*	*	*				*			*
Primula	*						*			*
Physostegia (Dragon's Head)	*						*			*
Salvia					*			*		*
Saxifrage (Rockfoil)	*	*					*			*
Statice (Sea Lavender)	*	*					*	*		
Violet	*									*

BULBS

Agapanthus	*						*		*
Alstromeria (Peruvian Lily)		*	*		*				*
Amaryllis (Belladonna Lily)	*				*		*		*
Anemone	*				*		*		*
Babiana		*			*		*		*
Begonia	*	*					*		
Calla	*	*					*		
Canna		*	*	*	*	*			

COLOURS OF FLOWERS (BULBS) — Continued

	White	Yellow	Orange	Brown	Red	Pink	Blue	Lilac Blue Purple Violet
Clivia			*		*			
Convallaria	*	*						
Crocus	*	*						*
Daffodil	*	*	*			*		
Freesia	*	*	*	*	*	*		*
Gladiolus	*	*			*	*		*
Hippeastrums	*	*			*			
Hyacinth	*				*	*	*	*
Iris	*	*	*	*	*	*	*	*
Ixia	*				*	*	*	*
Jonquil		*						
Kniphofia		*				*		
Lachenalia		*			*			
Lilium	*	*	*		*	*		*
Montbretia	*	*	*		*			
Nerine (Spider Lily)	*				*	*		
Petticoat Narcissus		*						
Polygonatum	*							
Snowflakes	*							
Snowdrops	*							
Sparaxis	*	*				*		*
Sprekelia	*							
Tuberose	*				*			
Triconia	*	*	*		*			
Tulip		*	*		*	*		*
Vallota	*				*			
Watsonia	*				*	*		*

Hints for the Rose Pruner . . .



Try to cut a rose leaving two leaves on the stalk.

To many gardeners rose pruning seems to be a very intricate and involved affair. If certain simple principles are followed, rose pruning should hold no terrors. For further details see Keith Winsor's *Pruning Manual*. Price 7/6 (plus postage).



Roses . . .

by DAVID MATTHEWS (Curator, Footscray Gardens)

THE rose is one of nature's most wonderful gifts. No matter what our station in life may be, few if any of us need be denied the joy of growing roses. They will grow with equal fragrance and beauty in the humblest cottage garden as they will when enhancing the beauty of the well-attended mansion garden.

Roses, in common with all plants, have preferences to soils and climates. It is a privilege we readily concede to them. But to those of us who are content to accept the blooms when nature can best provide them, and are willing to overlook a few imperfections, there will be few places in this sunny land of ours where the rose will not bring joy to the person who plants it.

Climatic Conditions

A mild climate with a clear atmosphere that is free from industrial fumes would be ideal. Cold, wet climates, where heavy frosts

are experienced, are detrimental to many varieties, especially to those originating from the *Pernetiana* type. Pruning in these districts should be delayed, and then should only be very light, in order to protect the

ROSES

stems as much as possible from frost, which often rifts the bark. Varieties producing very close double flowers often fail to open their blooms in damp or humid climates. It is better to avoid these when making a selection.

In very hot districts light-coloured blooms are liable to fade in the strong sunlight or be more readily damaged by thrips; so when selecting varieties choose the stronger colours for preference.

Situation

No rose will long remain healthy in a position that does not get the benefit of a full day's sunshine. Protection from strong winds will be a help in preventing damage to blooms, but the protection must in no way cause loss of sunlight, and if it is in the form of tree or hedge growth the plants must be far enough removed from the rose beds to prevent root encroachment.

Soil

The ideal soil combination would be a mellow loam built up to 18 in. in depth overlying a friable clay.

Volcanic soils also produce excellent roses. Care should be taken with the extra heavy types of volcanic soils to see that no water-logging occurs and that the soil is built up instead of deeply trenched.

Sandy soils have never been considered with much favour for rose-growing, but those of us who by necessity have had to produce roses on sandy soils know that they can be produced, not perhaps with the same sturdiness as on the loams or volcanic soils, but nevertheless of fair quality. It has long been recognised by rose growers—and I feel with justification—that tea roses and varieties belonging to the *Pernetiana* group do quite well on sandy soils.

The pH condition of the soil should be neutral. If it is found to be at all on the acid side a good dressing of lime, up to 4 oz. per sq. yd., should be applied. Take care not to use lime and nitrogenous manures within four weeks of each other, as the lime has a tendency to liberate the nitrogen too quickly and much of its value would be lost.

Drainage

A well-drained soil is a must for healthy growth. If the rose plots need draining, see to it that the drains are well laid and

not too close to the surface—2 ft. 6 in. would not be too deep. They must be given ample fall to a good get-away for the free water.

Cultivating and Fertilising the Soil

If the soil can be cultivated to a depth of 18 in. without bringing up the clay sub-soil, do so, but on no account bring any inferior soil to the surface. Keep the top spit on the top and improve the lower soil by the addition of suitable manures well worked into it. The whole plot should be well and evenly cultivated, finishing up with a depth of 18 in. of soil. Where the top soil is shallow, building up with good soil will be necessary. In the case of a hard pan of gravel, this should be broken up and removed.

Farmyard Manures

There is no doubt that farmyard manure not only adds fertility to the soil, but also considerably helps its physical condition. A 3 in. dressing of well-decayed stable manure should be worked in four or five weeks before planting time; or, failing this, a dressing of two parts superphosphate, two parts sulphate of ammonia, and one part of sulphate or nitrate of potash should be applied at the rate of 2 oz. to the surface yard and dug in. No hard-and-fast rule could be laid down for adding fertility to the soil. It is evident that to keep it in good heart occasional dressings of farmyard manure or well-prepared compost are required. It is a good practice to apply a mulch of stable manure or compost in the early summer to the rose plot, and give a dressing of the 2:2:1 mixture recommended for the initial preparation each year soon after the plants have had their winter pruning. Market garden manure, blood and bone manure, plus many other prepared mixtures, all have their values. Since trace elements have been found to be such an important factor in plant growth, it would seem good policy, where plants are not responding to the treatment given them for some obscure reason, to have the soil thoroughly analysed to find out where the deficiency exists and take steps to remedy it. A dressing of sulphate of iron, 1 oz. to the sq. yd., applied bi-annually helps to strengthen the foliage and add richness to the colour of the flowers.

Planting

The best time for planting lifted plants is from June to August. The colder the district the later the planting, and vice versa. Those grown in receptacles can be planted throughout spring and summer, but will need closer attention to watering.

DISTANCES TO ALLOW: For strong-growing bush or standards, 4 ft. apart; for less vigorous, 3 ft.

Polyanthas: For borders or group plantings allow 2½ ft.

Hedges: Strong-growing bush, 3 ft.; Polyanthas, 2½ ft.

Climbers: For fence covering, 6 ft. apart.

Planting Operation

Mark the positions on the prepared plot or bed. Excavate a hole sufficiently large to take the spread of the roots, and deep enough in the case of bush roses that have been budded to cover the stem to the point of union. The bottom of the hole should be firmed and the soil slightly raised in the centre to give the roots a downward trend. Trim off any damaged ends of the roots; cut a little off the branches if not already done; place the plant in position, spread the roots evenly, giving them a downward start; fill in some of the fine soil, tramp it firmly; give the plant half a gallon of water; later on fill in the rest of the soil. When the plant's growing buds have commenced to break, select the growths you wish to retain and shorten them back to a good bud; remove any weak or misplaced growths.

Planting Standards

Prepare the hole as for bush, allowing enough depth to cover the roots as they were in the nursery; that is, the stock stem should not have more than 2 in. under ground. Drive an inch-by-inch jarrah stake firmly into the ground so that the top of the stake just comes to the first break or branch of the head. Plant as recommended for bush. Tie neatly to the stake. *Never* allow any manures to come in direct contact with the roots when planting.

Stock Growths

Practically all commercially raised roses are budded on to other stock. Therefore throughout the growing period keep a sharp look-out for growths issuing from below the union of the rose and the stock. These

are readily distinguished by the different foliage from the rose required. When discovered, trace them to their point of growth and cut them closely and cleanly away from the stock. Roses, especially the strong-growing types, grow readily from cuttings taken of firm young wood and planted in the open ground. Autumn is the best season for striking the cuttings.

Insect Pests and Diseases

From time to time new insect pests appear, but the most troublesome are rose aphid, rose scale (insect), leaf-eating caterpillars, Rutherglen bug, red spider, and thrip.

The golden rule for insect destruction is: For the type that sucks the sap by piercing the bark, such as Aphides, Rutherglen bug, etc., spray with a contact spray that penetrates the soft bodies of the pests, or dust with one of the prepared dusts—Black Leaf 40, nicotine sulphate, or Clensel, used as directed on the containers. Pespruf 2G dust, Drymac (which is a derris dust), Insectibane and Pyrethrum, all prepared dusts, must be used as directed on containers.

For chewing insects, caterpillars, grubs, etc.: A stomach poison such as arsenate of lead or Paris green, used at the rate of 2 oz. per gallon of water.

Rutherglen Bug: Although a sucking insect, it can be very effectively dealt with by using benzole emulsion, 1 lb. to five gallons of water.

Scale Insects: The rose scale is a very difficult pest to eradicate. It can readily be identified by the white scales at the base of the rose stems. Spray immediately with a smothering mixture that puts a film over the scale, such as benzole emulsion, Volck, or white spraying oil. Use as directed on containers.

Thrip: The use of a deterrent such as benzole emulsion or T.C. 25 will prove helpful.

Red Spider: This minute insect gets on the undersides of the leaves during hot, dry weather and causes a good deal of damage to the foliage. When noticed, spray the undersides of the leaves with the hose. Also spray with nicotine sulphate, Black Leaf 40, or T.C.25. Be sure to get a good coverage on the undersides of the leaves.

There are many prepared mixtures on the market these days for dealing with insect pests, but do not overlook the golden rule mentioned about their feeding habits.

ROSES

Diseases of Roses

The fungus disease, known commonly as mildew, forms a whitish coating over the foliage and young tips, thus preventing the foliage from functioning well. Spray with lime of sulphur, 1 oz. to two gallons of water, or lysol used at one tablespoonful to one gallon of water. Both the above sprays will help check the trouble. Flowers of sulphur, with equal parts of freshly slaked lime mixed together, may be dusted over the foliage and around the plants in the early morning whilst there is enough moisture on the foliage for the mixture to adhere to the leaves. A dewy morning is essential. Prevention is always a precaution well repaid. Therefore immediately after winter pruning give your plants a spraying with some recognised fungicide, such as Bordeaux mixture, lime sulphur, or Kuremil. See to it that the plants get a ration of potash during the winter months—one handful of sulphate or muriate of potash sprinkled around each plant. Plant your roses where they will get ample sunshine, and give preference to varieties that are resistant.

Black Spot

Easily recognised by the black spots on the foliage, which quickly spread and cause the leaves to fall. This fungus disease is very prevalent in moist, humid weather con-

ditions. Plants on poorly-drained soils are also liable to attack. Prevent by gathering up and burning all diseased foliage and giving the plants a winter spray of one or other of the fungicides recommended for mildew control.

Die Back

This troublesome virus disease attacks the young shoots in the spring, causing them to drop their foliage and die back. Other shoots soon become affected, and the plant invariably dies. If the plant is a valuable one, cut out the affected shoots well below where the disease is evident, and wash the cut end and part of the remaining branch with a solution of 1 oz. of lysol to one gallon of water (pour the acid into the water). Condyl's Crystals, $\frac{1}{2}$ oz. to the gallon of water, can also be used. Virus diseases can be spread by using the secateurs or other cutting instruments on a diseased shoot, then cutting other shoots without sterilising. Therefore sterilise the implement in a solution of formalin before going to work on the other plants. Sucking insects can also transfer virus diseases. As the disease is thought to be present for at least two years before it becomes outwardly evident, diseased buds for increasing the stock could unknowingly be used. The resultant plants would probably die out the first or second year after planting out.



STANDARD AND THREE-QUARTER STANDARD OR BUSH ROSES FOR THE GARDEN

Tea, Hybrid Tea, and Pernetiana

RED SHADES:

William Orr
Ena Harkness
Crimson Glory
Daily Mail Scented
Charles Mallerin
Best Regards
Poinsettia
Grand Duchesse Charlotte
Chateau De Clos Vougeot
Charles Gregory
Brasier
Liebesglut

PINK SHADES:

Shot Silk

Pink Shades—Continued:

Lorraine Lee
Rod Stillman
Ophelia
Madame Butterfly
Dame Edith Helen
Madame Abel Chatenay
Mrs. Wakefield Christie Miller
Mrs. George Geary
La France
Mrs. Bryce Allan
Verschuren's Pink
Elizabeth of York (rich pink)

YELLOW SHADES:

Mme. A. Meilland (Peace)
Speck's Yellow

VARIETIES

Yellow Shades—Continued:

Diamond Jubilee
Dividend
Fontanelle
Golden Dawn
Golden Ophelia
Julien Potin
Sallie Lewis
Sir Henry Seagrave
Ville de Paris
McGredy's Yellow

BI-COLOURS:

Lamplighter
President Herbert Hoover
Talisman
Autumn
Betty Uprichard
Contessa de Sastago
Gaiety
General Gallieni
I. Zingari
Mrs. G. A. Van Rossem
Tally Ho
Forty-niner
Contrast

Climbing and Pillar Roses

RED SHADES:

Cl. Etoile de Hollande
Cl. Nancy Hayward
Cl. Crimson Glory
Cl. Daily Mail Scented
Cl. Black Boy
Cl. Chateau De Clos Vougeot

PINK SHADES:

Cl. Ophelia
Cl. Shot Silk
Cl. Madame Abel Chatenay
Souvenir de Georges Pernet
Cl. Picture
Cl. Dame Edith Helen
Cl. Rose Marie

YELLOW SHADES:

Cl. Golden Dawn
Cl. Madame Pierre S. du Pont

Wichuraiana or Rambler Roses

Banksia Yellow (small double flowers)
Dorothy Perkins (double rose-pink)
Excelsa (double bright crimson)
Hiawatha (carmine, white eye, single)
Lady Gay (double deep rose)
Paul's Scarlet (hyb. Wichuraiana; double scarlet)

WHITE or CREAM:

Portadown Ivory
Blanche Mallerin
Virgo
Madame Jules Bouche
McGredy's Ivory
Frau Karl Druschki
Mrs. R. H. Darlington
White Ensign
Mrs. Herbert Stevens
Mrs. Harold Brocklebank
Mrs. Foley Hobbs
Mrs. David McKee
Souvenir de Llette
Elizabeth Arden

COPPER SHADES:

Sutter's Gold
Taffeta
California
Cuba
Mrs. Sam McGredy
Heinrich Gaede
Lawrence of Arabia
M. Edouard Heriot

Yellow Shades—Continued:

Cl. Madame A. Meilland (Peace)
Cl. Mermaid
Cl. Talisman
Cl. Ville de Paris

WHITE:

Cl. Mme. Louis Lens
Cl. Frau Karl Druschki
Cl. Mrs. Herbert Stevens
Cl. McGredy's Ivory
Cl. Devoniensis
Cl. Sinica Alba (single)

ORANGE or FANCY COLOURS:

Cl. Mev. G. A. van Rossem
Cl. Mrs. Sam McGredy
Cl. Mme. Edouard Heriot
Cl. President Herbert Hoover
Cl. Golden Rapture
Cl. Margaret Dickson Hamill
Cl. Comtesse Vandal

American Pillar (single pink, yellow stamens)
Emily Gray (yellow)
Easley's Golden Rambler
Blaze (continuous flowering form of Paul's Scarlet)

ROSES

Floribunda or Polyantha Roses

Orange Triumph (orange scarlet)
Alain (blood red)
Goldilocks (golden yellow)
Pinkie (bright pink)
Tantau's Triumph (cinnamon scarlet)
Waverley Triumph (salmon pink)

Fashion (salmon shadings)
Red Pinocchio (red)
Ellen Poulsen (bright rose pink, double)
Cecile Brunner (light pink, yellow base)
Tip Top (coppery yellow and pink)
Summer Snow (white)

Moss Roses (*Rosa muscosa*):

Anni Welter (dark red)
Baron de Wassenauer (light crimson)
Captain Basroger (dark red, double)
Celina (brilliant crimson, double)
Old Pink (pale rose)
White Bath (paper white)

Rosa Roulettii (dwarf plant, growing only 9 in. high, producing perfect flowers in miniature; pink)
Rosa Lawrenceana (same as Roulettii, but red)

Single Roses

Nancy Hayward (rich pink)
De Ruiter's Herald (crimson with white eye)
Dusky Maiden (deep crimson)
Isobel (carmine red flushed with copper)

Irish Fireflame (orange, flushed crimson)
Mermaid (soft yellow)
Austrian Briar (copper with golden reverse)

Musk Roses (*Rosa moschata*)

Felicia (salmon pink, suffused yellow)
Francesca (chrome yellow)

Penelope (creamy shell pink)
Rosaleen (deep rosy red)

Weeping Standards

When budded on good strong stems not less than 5 ft. high they are very effective. The varieties used are mostly of the *Wichuraiana* type:—
Dorothy Perkins (double rose pink)

Excelsa (bright crimson)
Emily Gray (yellow)
Easley's Golden Rambler
Albertino (coppery pink)

Roses Suitable for Hedges

Elizabeth of York (rich cerise pink, suitable for hedges up to 5 ft. high)

Lorraine Lee (rose pink, very popular as a rose hedge, strong growing up to 5 ft. high)

Sunny South (pink flowers on yellow ground, strong grower up to 6 ft. high)

Cecile Brunner (light pink with yellow base, strong grower up to 4 ft. high)

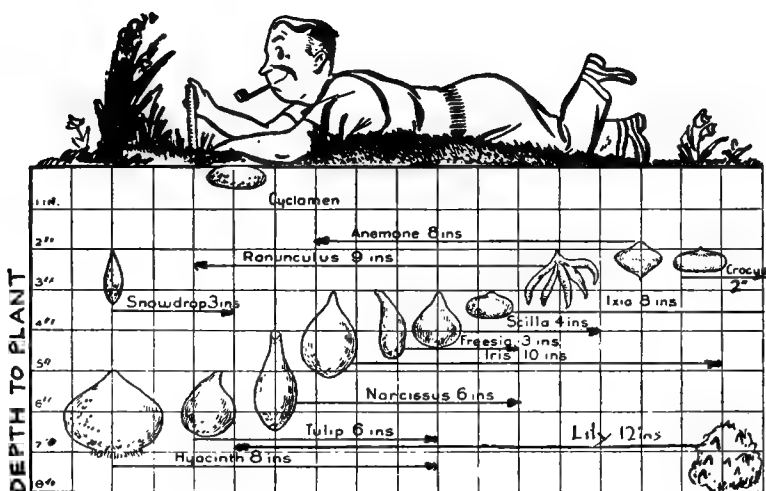
Shat Silk (coppery pink, good grower; would be suitable for hedge up to 4 ft.)

Ellen Poulsen, Polyantha (bright rose pink, for dwarf hedge to 2½ ft.)

Orange Triumph (double orange scarlet blooms, suitable for informal hedges to 3 ft. high)

Rosa Roulettii (pink, for dwarf edgings up to 9 in.)

Rosa Lawrenceana (red, for dwarf edgings up to 9 in.)



The Bulb Garden...

(Including Corms, Rhizomes and Tubers)

by DR. E. M. HUTTON AND C. J. SHAKESPEARE

(Of the Horticultural Society of Canberra)

With added recommendations by courtesy of Stinton's Nursery, Geelong

AVERAGE soil should be trenched or deeply dug, and well-rotted manure or compost incorporated in the lower layer, together with bone dust (a good handful to the square yard) and wood ashes. Avoid the use of fresh manure, also sulphate of ammonia, nitrate of soda, blood and bone, and other rich nitrogenous manures. Use superphosphate sparingly. Some bulbs are partial to lime, and this fact is referred to later when dealing with individual subjects. Avoid damp, soggy positions where drainage is bad.

Plant bulbs with the crown uppermost, smaller ones being covered with one to two inches of soil and larger ones with up to four inches of soil. Members of the Amaryllis family are an exception to this and are planted with the top part or neck of the bulb out of the ground. This family includes Belladonna Lily, Hippeastrum, Val-lota, Sprekelia, and Nerines.

With spring flowering bulbs do not delay planting beyond March; earlier is better, as

it allows good root development before the severity of winter impedes growth, and the bulb thus feeds with its root system and not on its own stored plant food.

During the growing period, especially in winter, keep the surface soil lightly cultivated, being careful to avoid injuring the foliage or bulb. Cultivation should be continued until the foliage dies naturally, as this will ensure good quality flowers the following season. Keep the soil moist always,

Winter Flowering

GLADIOLI

Westralian Hybrids

MANY years of research have gone into perfecting this beautiful new "Glad." It is a "Glad." that resembles the well-known summer ones, but has the happy habit of blooming when flowers are scarce, *in the winter*. A cross between a Psittacinus and an exhibition "Glad.," these hybrids range in colour from all shades of orange to all shades of red, apricot, cyclamen, and dusty pink. Corms were released for the first time in November, 1952, and were despatched to all towns in Australia, Tasmania, and New Zealand. Corms for next year will be available from October this year. Write for further information NOW.



JUBILEE GROWERS

25 First Avenue, Payneham Sth, South Australia

RHIZOMES AND CORMS

avoiding excessive watering. As they come to bloom, weak liquid manures may be applied to advantage.

Flowers are best cut in the early morning. When not cut for indoor decoration, all flowers should be removed as soon as they are spent, in order to build up the bulb for the following year.

Agapanthus africanus (African Lily)

These blue or white mid-summer flowers do well in a heavy soil in full sun or partial shade, with little attention, and should be allowed to grow into a clump. Need a good supply of water and do best if disturbed infrequently. Clumps may be divided in the spring. Plant the thick rhizomatous roots shallowly. Flowers are in clusters of 10-50 flowers on stems 2 to 3 ft. long. Also fine tub plant.

Alstroemeria (Peruvian Lily)

A desirable free-flowering plant with lily-like flowers, easily grown in a damp, rich soil. Plant from April to June about 6 in. deep and a foot apart. Keep moist during growing period and surface mulch with well-rotted manure, giving some shade in summer. Flowering period is late spring to January, and may be maintained by keeping flowers pinched or seed pods from forming. Can be grown in areas with severe winters by planting the roots after danger of frost in spring, and digging and storing after flowering when tops turn yellow. Most popular is *A. aurantiaca*, grows 3 ft. high and has reddish-yellow flowers. *A. Pelegrina* grows 2 ft. high and has lilac flowers spotted purple. *A. haemantha*, 3 ft., has red flowers with green tips, and inside is orange dotted purple. *A. pulchella*, 4 ft., has red flowers with green tips.

Amaryllis belladonna (Belladonna Lily)

The handsome trumpet-shaped flowers, obtainable in shades from white through pink to bright red, appear in early autumn without the leaves. Plant in March or April, about 8 in. deep and 12 in. apart, in a well-worked and deeply dug soil. Do not disturb for about five years.

A. hathor: Pure white flowers.

A. pallida: Pale pink flowers.

A. rosea maxima: Ten large deep rose flowers in umbels.

Anemone

Any good soil, moderately well drained, suits the anemone; prepare for planting by deep digging and incorporation of well-rotted cow dung in the soil; afterwards work into surface soil *finely crushed limestone* (not burnt lime) at the rate of 8 lb. per square yard. Plant in succession from March to May, the roots 4 to 6 in. apart, at a depth of 1 in. to 1½ in., choosing a dry day when the ground is in good working condition. In March and April, if the weather is dry, give them a good watering two or three times a week, and when the flower buds appear water the plants daily if the weather is dry.

A. St. Brigid: Large flowers, semi-double, with finely divided petals. Brilliant colours. Valued cut flowers (Amethyst Beauty, Blue Admiral).

A. coronaria: Giant single flowers (Blue Bonnet, Scarlet Emperor).

A. Fulgers: Scarlet. Do not thrive in moist positions.

A. blanda: Deep blue; useful in rockeries.

Arum or Calla Lily (Zantedeschia species)

Arums are grown for their ornamental foliage rather than for blooms, which are handsome and curious but have an unpleasant odour. An exception is *Sanctum*, the celebrated Black Calla or Black Lily of Palestine. Plant 4 to 6 in. deep, from February till April, in a moist situation. Lift bulbs in December after foliage has died down. Flowers appear in November.

Z. aethiopica (White Calla) has large white flowers with yellow-green leaves. *Z. Elliottiana* (Yellow or Golden Calla) has yellow flowers and dark green leaves with white spots. *Z. Rehmannii* (Pink or Rose Calla) is dwarf with long unequal-sided lanceolate, light green leaves. The spathe is white with a rose tint. Callas propagated from divisions of the parent rhizome planted 4 to 6 in. deep from February till April in a warm, moist situation. Somewhat frost-tender. Can be grown continuously in the same soil for several years if plenty of humus and dressings of nitrogen, phosphorus and potash applied.

Autumn Crocus (Sternbergia)

Yellow crocus-like autumn-flowering bulbous plants, which are easily grown and are most effective when massed. Plant from August to October, 4 in. deep and 6 to

THE BULB GARDEN

8 in. apart. Lift for division in June or July. Very hardy.

S. colchiflora: Small flowers.

S. lupea: Commonest.

S. macrantha: Large yellow flowers.

Babiana (Baboon Root)

Beautiful bulbous plants from Cape of Good Hope, bearing in September-October flowers ranging from blue to rose and rich crimson, etc., set off by dark green, hairy foliage; some are sweetly scented. They are of dwarf compact habit, growing 6-10 in. high, and are of great value for pots, rockeries, etc. An extremely hardy subject which thrives in almost any type of soil, provided it is planted on a sheltered sunny position and in land which is well drained. Plant March to May.

Bearded Iris

These irises are rhizomatous, and the "falls," or main drooping petals, have beards or hairs on the central parts. They have been improved considerably of recent years so that a wide range of fine varieties are available with striking flowers of various shades of blue, purple, mauve, yellow, and bronze, and some are white. The flowers are outstanding for indoor decoration. They are raised easily from seed.

Although bearded irises will grow successfully in partially shaded situations, they do best in a sunny position protected from the wind. Some protection from the wind is advantageous, as the rhizomes grow at or just below the soil surface. A moderately rich, well-drained soil which has been limed is suitable for transplanting out the rhizomes from the end of December to the end of February. The rhizomes are planted just below the surface with the roots going straight down. In August, mulch the new plants or old-established clumps with well-rotted manure or compost and give a dressing of superphosphate and some potash. This will stimulate flowering in November.

Clumps should be divided every three or four years for best results. They should be protected from snails with a suitable bait.

Canna

For outdoor beds and borders in summer and for cutting; 2-6 ft.; foliage handsome, green or purplish red. Flowers cream, yellow, orange or red, often with darker spots. Soil deep, fertile, fairly moist. Position sunny. Divide old roots in spring and plant when corm is planted, 1½ ft. apart, with eyes of tubers 2 in. beneath surface.

Cape Hyacinth

(*Galtonia candicans*)

Grows 3 to 6 ft. high according to soil and situation, and bearing a spike of 20 to 50 pure white bell-shaped flowers; a handsome decorative plant for grouping in the flower border. The plants flourish in good garden soil of a rich and gritty nature, and become quite luxuriant in a really rich mould. To secure a bold effect several bulbs should be planted about 12 in. apart and 5 in. deep. Once well-established the plants are best left undisturbed for several years, in which case they should receive a thin mulching of well-decayed manure in autumn. Plant May to August.

Cape Lily (Crinum)

Herbaceous bulbs with sweetly-scented and large trumpet-shaped flowers of delicate shades, mostly pink, red and white, which appear in January-February. They are gross feeders and should be kept moist in growth. Plant in well-drained, deeply-dug soil during June or July, keeping the neck above the soil and bulbs about 9 in. apart. Lift only to divide every four or five years in May or June.

C. amabile: Pink.

C. flaccidum (Australian Lily): White.

C. longifolium: White, red outside; large.

C. Powellii: Deep rose, pink, white.

Chionodoxa Luciliae (Glory of the Snow)

These charming dwarfs with hyacinth-like blue flowers (some with white centre) bloom in September and October. They prefer a cool position. Plant in February and March, 3 in. apart. Lift bulbs only for dividing. They do well in bowls or pots.

C.L. grandiflora: Deep blue, white centres.

C. lucilac.

C. cretica: Pale blue and white.

C. sardensis: Pure blue flowers.

Crocus vernus

There are yellow, purple and white varieties. They prefer a cool, shaded position, and light, moist, well-drained soil. Plant in mid-March, 3 in. deep and 3 in. apart, in clumps. They flower in August. Lift bulbs every year in November.

Cyclamen (Persicum giganteum)

As the plants, in a state of nature, are generally found growing on sandy or chalky

PROPAGATION AND PLANTING

porous soil, with the tubers well out of the ground, it is essential in gardens to have a well-drained, loamy soil, to which leaf mould, peat, and some limestone rubble or mortar rubbish may be added. If grown as pot plants, prepare a compost of good fibrous loam three parts, leaf mould one part, and good coarse sand one part, and add a little old mortar rubble to the mixture. Plant January-March.

C. africanum: Lilac flowers in autumn; suitable rockeries.

C. europeum: Autumn flowers, red.

C. persicum: Sheltered gardens. Commonly grown in pots in glass-houses.

Daffodil (*Narcissus*)

Only well-rotted manure, bone meal and wood ashes or sulphate of potash should be used in soil preparation. A light sprinkle of superphosphate could be used if bone meal is unobtainable, but no sulphate of ammonia, which induces bulb rot. Plant the bulbs about 4 in. deep and 3 to 4 in. apart in late January, February or early March. Flowering is from August to November. Daffodils propagate by natural splitting of the bulbs, which only need to be lifted every three years. After lifting they should be cleaned thoroughly, sprinkled with sulphur when dry, placed in paper bags, and stored in a cool, dry place for subdividing at planting time.

CLASSIFICATION OF DAFFODILS

Daffodils are classified under many different types of headings:—

DIVISION 1—*Trumpet Daffodils*: Trumpet must be as long as or longer than the perianth segments.

DIVISION 2—*Large Cupped Daffodils* (*Incomparabilis* and *Leedsii*): Cup or corona not less than one-third but less than equal to the length of the perianth segments.

DIVISION 3—*Small Cupped Daffodils* (*Barrii*): One flower to a stem. Cup or corona less than one-third the length of the perianth segments.

DIVISION 4—*Double Daffodils*: Includes all varieties which have more than two rows of perianth segments or possess double trumpets.

DIVISION 5—*Cyclamineus*: Perianth reflexed; deep orange trumpet.

DIVISION 6—*Triandrus*: Short cup, outer petals reflexed.

DIVISION 7—*Poeticus*: Broad petals, alabaster white; short round scarlet cup.

DIVISION 8—*Tazetta*: Several flowers on a single head.

Dahlia (*Dahlia pinnata*)

They thrive in a well-drained, sunny position, sheltered from the strong westerly winds. Being heavy surface feeders, the top soil needs to be rich in plant food. Where a special bed is reserved for them the best preparation is to dig over to a spade's depth in May, lime well, and plant a few weeks later with field peas or barley, giving the soil a good superphosphate dressing at the same time. In the spring, when the green manure crop is well grown, dig it in and prepare the bed for planting. Where a special bed is not reserved for dahlias the soil can be prepared in spring six weeks before planting by digging in liberal quantities of well-rotted animal manure or compost, giving a dressing of lime and superphosphate at the same time. A liberal dressing of potash should be supplied also.

The soil in the finished bed should be friable and well-drained. To promote drainage the level of the bed should be raised above the general soil surface.

TYPES OF DAHLIAS

Dahlias are classified into the three main groups—decorative types, cactus types and ball types. Good results cannot be expected by planting dahlia tubers (actually roots) of doubtful origin. It is much better to decide on what types it is intended to grow and purchase named varieties from reliable dahlia specialists. Catalogues can be obtained for new varieties each year.

PROPAGATION

Dahlias can be grown from seed, but do not come true to type. While it is an interesting hobby, it is difficult to obtain good types by this method. When first raised from seed, dahlias are free of the spotted wilt virus. Grown in isolation, or where thrips are inactive, keep seedling dahlias free of spotted wilt. Usually they become infected by thrips, which carry the virus from diseased dahlias, tomatoes or other garden plants. Some varieties tolerate spotted wilt.

PLANTING

For garden display tubers planted in October will provide flowers from the end of December onwards. For show purposes later planting of tubers and green plants is advised—from the end of November to mid-December. When planting, drive in hardwood stakes, allowing rows 3 ft. 6 in. apart and plants 3 ft. apart in the rows for the larger types, and rows 3 ft. apart with plants 2 ft. 6 in. apart in the rows for the smaller types. Plant on the easterly side of

THE BULB GARDEN



Pompon



Single



Collarette



Double



Peony



Informal



Giant Decorative



Cactus

the stake to gain some shelter from the hot afternoon sun and facilitate the tying of plants to obtain protection from winds. Place tubers in an inclined position, the piece of stem with the bud 2 in. below the surface, and the opposite end somewhat deeper. Some sand is run around the tuber to prevent contact with manure, which causes rotting. Cover with soil, give a light watering, and do not water again until the plant is about 8 in. high. The tubers are apt to rot at this stage if over-watered. Green plants are planted slightly deeper than they were in the pot, and in a depression 2 in. below the surface of the bed. Lay snail bait, and protect for a few days from the sun. Water carefully until the plants have taken, and fill in the depression around them as they begin to grow.

TREATMENT OF GROWING PLANT

When about 8 in. high, tie to the stake, allowing for later stem expansion. Pinch the centre out of the plant just above the third pair of leaves. As a result, four to six laterals are developed from the plants.

One good watering a week is sufficient until the bud stage is reached, but after a hot day the foliage should be sprinkled above and below. Cultivate regularly, but not too deeply close to the plant.

TREATMENT FROM BUDDING TO FLOWERING

Cultivation should cease at budding to avoid damage to the surface feeding roots. Rake in around the plants a dressing of a mixture of four parts superphosphate, four parts blood and bone, and one part of potash, and then apply a mulch of well-rotted manure, compost, or lawn clippings. More frequent waterings are needed at this

stage. Every week apply liquid cow manure or a solution containing a tablespoon each sulphate of ammonia and superphosphate.

Where growing for exhibition purposes a system of disbudding is needed in all except Charm and Pompon types. Three buds form at the tips of the branches, and the centre or crown bud usually produces the best and largest bloom.

Blooms allowed to develop on a plant should be removed as soon as they are spent, cutting back to the last lateral that has been allowed to remain.

TREATMENT AFTER BLOOMING

When the tops have died down in April or May, after the first frosts, cut the plants off about 9 in. above the ground. If the bed is well drained the tubers can be left in the ground, and dug and divided at the end of September. If dug straight away, leave plenty of adhering soil, place in a dry sheltered position, cover with a layer of earth, and keep snail bait about the heap.

In the spring give the clumps a hosing to remove the soil and expose the buds on the old stem. Divide up, making sure that each tuber carries a piece of last year's stem with a bud.

Freesia refracta

Old favourites noted for their fragrance, which, once planted, need not be lifted except for division. Plant corms in the open in February, 3 in. deep and 3 in. apart, in clumps of six to 12, or as a border. They require a warm position, with protection from frost during flowering in the early spring. White, pink, mauve and orange varieties available. New hybrids produce stems up to 2 ft. tall. Seeds sown in January and February will flower in spring.

DIGGING OF CORMS

Gladiolus (*Gladiolus hortulanus*)

Three types of gladioli are recognised—the grandiflorus or exhibition type, which produces large flowers, long buds, long spikes, a large number of flowers open at one time, and petals ruffled or plain; the primulinus type, with hooded blooms and florets farther apart than in grandiflorus; the primulinus grandiflorus type, which combines the beauty of primulinus with the strength of spike and placement of flowers of grandiflorus.

SOIL CONDITIONS AND PLANTING

Gladioli grow in any well-drained soil in a sunny position. Best results are obtained in a rich sandy loam, which encourages cormlet production. Prepare the soil a few months before by digging in a good dressing of well-rotted manure with some superphosphate. At planting, light dressings of sulphate of ammonia and potash are beneficial.

The dormancy of corms and cormlets can be broken for quick replanting by exposure for four days at 70° F. to 75° F. to the vapour of 40% ethylene chlorhydrin in a closed container, the chemical being soaked up in cheesecloth and used at the rate of 2 cc. per quart of corms or cormlets. The same effect is produced by soaking for three days in a solution made by adding four teaspoons of the chemical to one pint of water.

Corms planted in early spring flower at Christmas. The best flowers are obtained from a late December or early January planting. Remove the husks, give preventative fungicidal dip if necessary, and plant the firm, plump, disease-free corms 4 to 6 in. apart in rows 12 in. apart. Small corms are planted 3 to 4 in. deep and larger ones a little deeper.

Water and cultivate during growth, giving the plants a dressing of complete fertiliser when they have four to six leaves. At this stage cultivation should not be near the plant bases as the small fibrous feeding roots will be disturbed.

FLOWERING AND DIGGING CORMS

Flowers develop in 70 to 100 days from planting, depending on whether the varieties are early, mid-season or late. As flower spikes appear, staking and shading may be necessary for choice or exhibition blooms. Spikes can be cut when the first two or three flowers open, the rest opening indoors. When cutting, leave at least four leaves on the plant. After cutting, watering is reduced,

and at six weeks after flowering, when the leaves are yellowed off, the plants are dug carefully so the cormlets are not lost or left in the soil. The dry tops are cut off close to the corm and burnt.

Let corms dry out in boxes for a few weeks, when the old corm and outer husks only are cleaned off. Corms should be dusted with D.D.T. powder and stored in boxes or bags until next planting time.

A PRIZE COLLECTION OF GLADIOLI

ALGONQUIN—Brilliant scarlet.
AVONDALE—Mauve pink with maroon throat.
BEACON—Bright salmon, cream throat.
BERNADINE—Brilliant scarlet.
BLACK MAGIC—Black red.
BLACK OPAL—Dark crimson.
BLUE BEAUTY—Light blue.
COLUMBINE—Pale pink.
DAUNTLESS—Pale pink.
DAYBREAK—Buff or straw yellow.
DEVON—Rich magenta.
EUIDES—Ivory white, flushed pink.
GIANT CYCLAMEN—Cyclamen.
GRETA GARBO—Pale creamy rose.
HARMONY—Distinct pink.
HARMAU—Orange rose.
JOHAN van KONYNENBURG—Orange red.
KAWATIRI—Cream and buff.
LIBERATOR—Orange salmon, crimson throat.
MARGARET BEATON—White, scarlet throat.
MIDNIGHT SUN—Unusual smoky.
MRS. R. G. ERREY—Large black red.
MOONGLO—Light yellow.
OVERTURE—Large exhibition pink.
PEACH PETAL—Buff with rich yellow throat.
PELEGRINA—Dark violet.
PINK JEWEL—Soft shell pink.
QUIBERON—Orange apricot.
RADIANT—Flame scarlet, cream throat.
RED CHARM—Rich mid red.
RED ENSIGN—Scarlet, white throat.
REWI FALLU—Blood red.
RIALGAR—Apricot yellow.
ROSEA—Clear rose.
ROYAL GOLD—Yellow.
SINCERITY—Cream, scarlet throat.
SNOWFLAKE—Good white.
ST. EDWARD—Orange scarlet, white throat.
SUNGLO—Orange apricot.

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SUNKIST—Glowing apricot.
TAKINA—Rosaline purple.
TALISMAN—Apricot.
TARONGA—Magenta, white throat.
TITAN—Salmon.
TIVOLI—Soft pink and cream.
VAGABOND PRINCE—Garnet brown.
VALIANT—Deep red.
WISTARIA—Lilac pink.

Grape Hyacinth

To secure the best results, the soil should be of a sandy, gritty nature, well-enriched with old cow manure or well-rotted stable manure, or, failing this, plenty of leaf mould. A wet, heavy soil is not desirable, but can be improved in drainage and temperature by trenching and adding plenty of sand and manure. The best time for planting the bulbs is from March to the end of April.

Most suitable for bordering is *Muscari botryoides*. Plant 3 in. deep and 4 in. apart. Flower August-September. Colours include white and pale pinks, in addition to the better-known azure and pale blues. *Muscari moschatum* is yellow and slightly frost-tender. *Muscari plumosum* (Feather Hyacinth) has amethyst flowers in clusters. Grape hyacinths do well in pots and bowls, especially in bulb fibre.

Hyacinth (*Hyacinthus orientalis*)

PROPAGATION

To multiply hyacinths, the bulbs are scored, scooped or cored immediately after digging. In scoring, the bulbs are cut right around longitudinally through the basal plate to the tip with three cuts. With scooping, the basal plate is scooped out, and in coring a $\frac{3}{8}$ in. to $\frac{1}{2}$ in. core is removed from base to top. The treated bulbs are dusted with Tetroc and placed in trays in well-ventilated sheds kept at 70° F. to 90° F. The cut surfaces callous over, and after two or three months bulblets form along the cuts when the whole is planted. The bulblets send up one or more leaves each, and after maturity they are separated and replanted. It takes four or five years to produce a flowering-size bulb. The bulb does not renew itself each year, but expands annually.

Hyacinths can also be propagated from leaves, outside ones being preferred. They are taken before they yellow and are placed in sand like other cuttings. Bulblets form at the basal end and along the edge of the leaf in two to four weeks.

CULTURAL CONDITIONS

Well-drained positions should be selected and rich sandy loam is the ideal. Heavy soils are modified with plenty of rotted humus added some time before planting. At planting, well-rotted manure and some potash and superphosphate are worked into the subsoil with a suitable trenching method so that the bulbs are not in contact with it. The bulbs are planted in January, 6 to 8 in. apart at a depth of 4 to 6 in. Root growth is very active until winter, hence the necessity for early planting.

The fragrant flowers of the hyacinth are among the first to appear in the spring and are obtained during September to early November. The bulbs should be lifted each year early in December after the leaves have died down, but should be replanted in three to four weeks. This is because the bulbs have a short dormant period and the new root system starts to develop soon after digging.

Hippeastrum

Hippeastrums are valued for the large lily-like red, pink or white flowers borne on stems from a 3 in. globular scaly bulb. The bulbs seldom produce natural divisions, so the plants are propagated mainly from seeds. Plant bulbs with neck at ground level from February onwards. After flowering the plants are kept growing for a month or so, when the bulbs, with the large leathery leaves attached, are removed and stored together. They need rich, moist soil with good drainage, and grow best in full sunlight.

H. Ackermannii: Crimson hybrid.

H.A. pulcherrimum: Crimson, striped green.

H. vittatum: White flowers, striped red.

Iris

There are many bulbous and tuberous-rooted irises. Bulbous iris include English, Dutch and Spanish irises (see Bulbous Iris). Tuberous-rooted irises include the Bearded (or Flag) Iris and the Japanese Iris (see Bearded Iris).

Iris (bulbous species)

Iris Xiphoides (English), *Iris hollandica* (Dutch) and *Iris Xiphium* (Spanish). There are a large number of varieties of these coloured purple, blue, white or yellow. Dutch iris is larger than Spanish and flowers earlier; both are very hardy. English iris flowers later and has attractive large open flowers, some varieties having their petals dotted with contrasting colours. *Iris tingitana* is a large blue iris with an orange spot, and flowers

CULTURAL CONDITIONS

in late winter. Iris need a sunny position and well-limed rich soil. Bulbs planted 4 in. deep in March and April need protection with a mulch of straw. Keep the soil moist and protect from winds and snails.

Ixia

Plant corms from February to April in light well-drained soil, and in warm sheltered positions. Plant 1 in. deep, 2 in. apart in clumps of 12, or as a double border. They flower September-October. Lift each year, as they multiply profusely.

I. viridiflora: Green flowers with black centres; popular.

I. crateroides: Brilliant scarlet.

I. longiflora: Salmon pink.

Japanese Iris

The most handsome of all irises. Stems 1½ to 2 ft. high. Flowers are of a rich velvety colouring, and are of immense size. Specially suited to moist conditions, this subject thrives when planted on the bank of a pond or watercourse where the roots have free access to water. Plant May-August.

Aiufukurin: Beautiful ruby pink edged white halo surrounds yellow blotches; petaloid stigmas large white with purple surroundings; three petals.

Manadzura (Crane): White, yellow blotches, radiating out into sky-blue feathers, petaloid stigmas tipped violet and speckled white; this variety will at times give a creamy-white flower; six petals.

Taikeraku: Rich vinous purple, with conspicuous yellow blotches tipped blue, radiating out in purple veins and feathers, petaloid stigmas grey and lavender, six petals.

Lachenalia

Favoured for pot culture, lachenalias also do well as a border or bedded, but need a sunny position with some protection from frosts. Varieties of *L. quadricolor* have spikes of bell-shaped flowers coloured red, yellow or green, with purple tips. *L. aurea* has golden yellow flowers, and *L. pendula* red. In *L. pearsonii* the flowers are orange.

Lilium

Place bulbs with the neck about 2 in. below the surface, and stem-rooting varieties 3 in. Bulbs should not be less than 12 in. apart to allow for development. The old practice of encasing the bulb in sand is not advised. February to April is the planting period, but bulbs may also be planted in early spring.

During the growing period surface mulching with compost or well-rotted manure is advised and care taken to keep the soil moist, avoiding overwatering. Late November to January is the flowering period. If not cut, remove blooms regularly to prolong flowering and conserve bulb energy.

Bulbs should be left undisturbed for years, but may be lifted after the tops die down, in February, for division. Before replanting replenish the soil with plenty of organic matter.

Lilies are propagated from seeds, scales, stem bulblets, or by natural increase of bulbs.

There are three main types of liliums—trumpet-shaped, upright cup-shaped, and the martagen type with drooping flowers and reflexed petals. In recent years hybridists have crossed these types, principally the latter two, to produce many desirable subjects, which are now being catalogued in increasing numbers.

The following have been selected as being desirable species which do well in the Tablelands zone or cooler climates:—

L. auratum (Golden-Rayé Lily of Japan).

L. candidum (Christmas or Madonna Lily): Pure white trumpets. One of the earliest flowering.

L. elegans: Deep red, black spots.

L. Henryi (Golden Tiger Lily or Yellow Speciosum).

L. regale (Regal Lily): Purplish outside, white inside. Trumpet-shaped fragrant flowers.

L. longiflorum (November Lily): Pure white trumpets.

L. speciosum varieties, including: *album* (White Tiger Lily); *magnificum*, varieties with shades of rich pink and white; *rubrum* (Pink Tiger Lily), pink and white, spotted.

L. tigrinum (True Tiger Lily): Orange-scarlet, black spot. Flowers reflexed. Produces black bulblets in leaf axils. These can be planted.

L. Thomsonianum: Delicate pale pink.

L. pardalinum (Panther Lily): Yellow and orange-red, spotted.

The latter likes wet "feet," grows to about 7 ft. high and needs staking or wind protection. Many of its hybrids are richly coloured—from pure apricot to deepest orange-red, heavily spotted.

Lily of the Valley

(*Convallaria majalis*)

Has choice little bell-like flowers coloured white, although *C. majalis rosea* has pink

THE BULB GARDEN

flowers. The *Fortens* variety has large white flowers. They thrive in a moist, shaded position; are gross feeders, and relish a soil enriched with well-rotted manure. Plant the roots in April and May, 3 to 4 in. apart, covering the crowns with an inch of soil. Flower October-November. Do not disturb for years. Each year, in late winter, cover the bed with an inch of well-rotted manure.

Convallaria polygonatum (Solomon's Seal) belong to the same family, and is similarly grown; it is also favoured as a pot plant.

Sandersonia (the Golden Lily of the Valley) belong to a different family. Follow the same treatment as for Lily of the Valley. They are grown from tubers, which should be planted with the prongs down from March to August. The bright golden-orange blooms appear in November.

Montbretia (*Tritonia crocos-maeiflora*)

Useful January-February flowering bulb, and a good cut flower, easily grown in a not-too-rich soil. Its red and orange blooms resemble small gladioli. Plant from July to October, 3 in. deep and 5 in. apart. Do not lift except to divide in May or June.

Nerine (Guernsey Lily)

Attractive autumn flowering bulb, always admired, in colours from white to deep red. Flowers without the leaves, which appear in winter and spring. Likes a rich soil, well drained. Plant them June to September with neck of bulb above ground level, and 3 in. apart, in clumps of six. Do not lift except to divide in June.

N. Bedouin: Scarlet-cerise large open flower with recurved and waved petals. Tall grower.

N. Bowdenii: Flowers are large, open, and borne on long stems; excellent for cutting and of a fine shade of pink.

N. elegantissima: Large trusses of charming pink flowers with rose stripe down centre of each petal; strong free-blooming variety, rather late flowering.

N. sarniensis: Rosy crimson; large flowers on long stems.

Ornithogalum (Star of Bethlehem)

Three species — *O. arabicum*, *O. thyrsoides*, and *O. lacteum* — should be better known. The handsome flowers of creamy-white with yellow anthers are good for

cutting. Do not need a rich soil and can be grown right out in the open. Plant in February-March, in clumps of six, 3 in. deep and 4 in. apart. Flower October-November. No need to lift except for dividing. Can be raised from seed.

Ranunculus

They like an open situation, well exposed to the sun, but sheltered from the cold and heavy winds. For best results the land should be deeply dug and enriched with a liberal application of well-rotted cow dung, after which work into the surface soil *finely crushed limestone* (not burnt lime) at the rate of 8 lb. per square yard.

PLANTING

After having thoroughly wet down the land and worked the soil up to a fine tilth, select a dry day when the land is in good working order. Planting should be carried out from March to May. Set the tubers 6 in. to 9 in. apart, pressing them firmly into the soil, claws downwards, and cover them with porous sand; keep the crown of the tuber 1 in. below the surface. During dry weather the plants should have an abundance of water. Should the plants lack vigour in the spring, a light application of nitrate of soda will be found beneficial. This is best applied in liquid form, through the rose of a watering can, care being taken to thoroughly wash the foliage of the plants to avoid damage by sodium. Make the sodium solution at the rate of 2 oz. to the gallon, which should cover an area equal to 1 sq. yd. of soil.

Snowdrop (*Galanthus nivalis*)

These thrive in a shady place in good light soil and need not be disturbed. Flowers are white with pretty green cup. Single and double varieties are available. Plant in March-April, 3 in. deep and 4 in. apart. Flowers appear in September-October.

Sparaxis

Delightful spring-blooming bulbs of the ixia group; their beautiful flowers are borne on graceful spikes and the colours are of the brightest shades. They are tигed, blotched, spotted, streaked and flushed. Colours range from cream to orange, scarlet and maroon. Plant bulbs March-April. Ordinary garden soil will suit them; the position should be sheltered and well-drained.

Fire King: Brilliant fiery red.

S. grandiflora: Deep violet-purple.

S. tricolor: Rich orange-red.

SOWING TIMES

Tuberose (*Polyanthes tuberosa*)

Tuberose require a warm position, a deep rich soil and plenty of moisture. Waxy white flowers in late autumn, so needs some protection from frost damage. Plant tuberous roots after danger of frost in spring, 1½ in. deep and 6 in. apart. Lift in April, cutting off 2 in. of stem with bulb. Before replanting, remove adhering pips and plant out in rows 5 in. apart. They will develop into excellent tubers for the following season.

The Tuberous Begonias are, without a doubt, among our finest glass-house subjects. They are easy to cultivate, provided that they are attended to correctly. Tuberous begonias require a good, rich fibrous loam to which a little charcoal has been added. Good drainage is essential. Many failures are due to the plants being forced into growth too early after potting.

When the tubers are potted they should be put into a frame over which there is a hessian roller, and allowed to come into growth gradually. It will be an advantage not to move the plants into the glass-house until near the flowering stage.

Begonias will not thrive in a badly-ventilated house. They require a maximum amount of light and air in order to obtain the most satisfactory results. Begonias grown in a closed glass-house will become tall and weak, producing only small blooms.

The ideal house for begonia culture is one with a fairly low roof, having the windows along the sides to open outwards. Ventilators in the roof and under the benches are necessary to ensure an even flow of fresh air round the plants. The glass in the roof should be lightly whitewashed on the inside. The best results can be obtained if the windows are left open night and day. When the flowering season is finished and the foliage has died down, the pots should be laid on their sides underneath the benches and left without water until the growth commences again about October.

Tulip

Tulips are easily grown and most suitable for mass bedding, and are available in a wide range of colours — red, pink, yellow

and purple, some with brown and black markings. Plant in well-drained and enriched soil in March, 3 in. deep and 6 in. apart. They need phosphate and potash, but little nitrogen. Flowering period is of short duration at end of September or early October. Lift bulbs each year about six weeks after flowering, when leaves show signs of dying down but are still partly green. Detach dried-off foliage before storing. Avoid replanting in the same bed. Darwin is the most favoured sort.

***Tigridia pavonia* (Tiger Flower or Jockey's Cap)**

Sometimes erroneously called tiger lilies, *Tigridias* are free-flowering and each of the vivid flowers lasts only one day, but each stem produces a succession of blooms over a considerable period. There is a wide range of colours in reds, pinks and yellows obtainable. They like a sunny aspect. Plant bulbs during May to August, 3 in. deep and in clumps. Lift after well established for division in May.

***Watsonia hybrida* (Bugle Lily)**

Watsonias are easily grown, with little attention. Cultural requirements are similar to those for gladiolus. Plant in March, 4 in. deep and 6 in. apart, in groups of three or four. Flower October-November. Lift bulbs and store. A wide range of colours in red, pink and white available.

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Flowers All The Time

You can plan to have a good show of popular bulbs in bloom in your garden all the year round.

SPRING FLOWERING: Anemones, crocuses, daffodils, hyacinths, grape hyacinths, narcissi, cyclamen, Scillas, early tulips and lilies of the valley.

FOR SUMMER: Begonias, camassia, irises, Madonna and tiger lilies, etc., and gladioli.

AUTUMN: Crocuses, gladioli, meadow saffron and montbretia.

WINTER: Aconites, crocuses, chionodoxa, and iris reticulata and iris stylosa.

★

Assymetrical arrangement to denote motion — Chrysanthemums are mainly used, with a couple of gladiolus to give height. A few stems of wheat have been used for lightness.



Flower Arrangement

. . . THE FLORAL ART

by CR. W. A. COMEADOW, O.B.E.

(President, the Royal Horticultural Society, and Editor, "Your Garden")

A FEW years back all that was necessary in floral arrangement was to push a few flowers into a vase, without any further thought, but today we think of it somewhat differently. There are perhaps four major principles to be considered: DESIGN, SCALE, BALANCE, and HARMONY. Of course, there are more, but these are the first consideration.

DESIGN: The shape or the outline of the arrangement.

SCALE is the relative proportion of one part of the decoration to another—flowers, container, and foliage.

BALANCE: The sense of proportion as to whether the arrangement may be top-heavy or balanced. This refers also to the individual flowers. It is not necessary to have a formal arrangement to get balance. The informal or assymetrical type must also balance.

HARMONY: Individual tastes must differ, but it must be something pleasing—no discord in colour or in container. Many may like some arrangement without being able to know why. If the arrangement is checked with these four main principles you will be likely to recognise that these are the principles behind the actual working up of the flower arrangement.

Modern Art

What is modern art? Perhaps it could be described as a breaking away from the traditional—an attempt to arrange new and unusual effects.

The result must be something attractive—a mere bizarre effect in itself may not have the slightest appeal.

Contrasts of colour are employed for effect, but generally we find it better for one colour to predominate. Most beginners are apt to crowd too many flowers into an arrangement. Remember the slogan, "If in doubt, leave them out." A flower perfect in itself may not be suitable for an arrangement.

The modern tendency even in the mass arrangements is to use fewer flowers. Today they are more informal and less densely crowded, thus enabling the beauty of the individual flower to be seen.

The Moderns

A few points and principles of modern art may be of interest to readers; of course, many refer to any arrangement.

Keep larger flowers well down in any decoration. Dark flowers should also be well down and lighter colour blooms in the higher portion of the exhibit.

Rounded blooms are better situated lower in an arrangement, the spiky types in the upper portion.

The lip or top portion of the container should either be hidden or its line broken by flowers or foliage.

Table decorations must not obstruct the view across the table. Flowers with strong perfume are not ideal for table decoration.

In any type of arrangement the rose, needle-holder or wire used as an aid in keeping flowers in position must be hidden. This may be done by moss, a few leaves, or by keeping a few flowers low down. The finish of any decoration—and this refers also to the back of arrangements viewed from the front—must be attended to. This is of most importance when an arrangement is placed in front of a mirror, where the back of the arrangement is reflected as a part of the decoration.

The focal point in an arrangement is where the eye seems first to hit, usually about the lip of the container. This is the spot where usually a large flower or a mass

of smaller flowers of one colour could be placed to advantage.

When we speak of unity it represents the fitting in of all component parts of a composition—the container, background, accessories, and the arrangement. One out of place or wrongly used could spoil the overall effect.

Keeping Flowers

Some flowers keep better and last longer than others. You may be able to help in keeping them by these few hints:—

Hard stems such as hydrangeas and chrysanthemums should have the last inch of the stem crushed. This enables them to take up water more readily. Such flowers as dahlias and poppies as soon as picked should have the bottom of the stem burnt—taking care that the blooms are kept away from any heat.

Change the water in vase often and remember that any leaves in the water soon pollute it and affect the keeping of all the flowers. A little charcoal added to the water helps to keep water sweet.

Keep flowers away from draughts, gas, fires and radiators.

Flowers last better if picked in the cool of the evening or in the morning before sunrise. If picked in the middle of a hot day they quickly droop and are almost useless.



This line of arrangement of daffodils in the Hogarth Curve, or "Lazy S," demonstrates one of the most popular types of floral decoration among floral artists. Each daffodil can be easily seen in the arrangement.



The oval is a simple arrangement, but the judges at an R.H.S. Show said that with a little movement the "blind spot" in the centre, where the stems are showing, could have been hidden. Daffodils have been used neatly.

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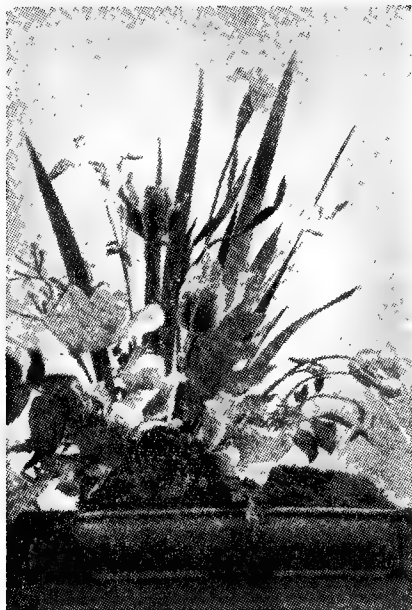
Some Further Examples of Effective Floral Arrangements

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These simple but beautiful designs serve to show what even a complete novice can achieve by thought and care in the arrangement of common garden blooms. The floral arrangement at the right was an entry at the Royal Horticultural Society (Vic.) Show in the Melbourne Town Hall. A few stems of pussy willow, a couple of stems of blossom and a few hyacinths are all that's necessary for this decoration.



Use an oblong trough for the container, and use two needle holders, held in place with plasticine or a little adhesive tape. On the previous page are line drawings and descriptions of other entries at this show. These show the ideas of arrangement and the forms followed in greater detail. In both these arrangements daffodils were used. Cr. Comeadow, R.H.S. President, who is the author of this article, said at the show that the floral arrangements were among the best he had seen.



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*Illustrations by courtesy of
"Your Garden" magazine.*

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A MODERN DECORATION: An effect to give the impression of life and growing. Notice how the flowers and foliage seem to be growing out of the lichen and moss.

Culture
of . . .



Exotic Orchids . . .

by H. A. SEYFARTH

(Author of *Cymbidiums and How to Grow Them*, etc.)

THE greatly increased interest in the culture of orchids in Australia in post-war years shows no sign of diminishing; on the contrary, the cult seems to attract more and more adherents each year. In this we are following the experience of the older countries: In U.S.A., for example, we read of one commercial grower of the *Cattleya* genus with an establishment of more than a million square feet of glasshouse space, devoted solely to the production of flowers for the florist trade.

In England, orchids have been grown in artificially heated houses for more than a century, and big concerns produce new hybrids each year, which are exported to growers all over the world.

One is tempted to rhapsodise on the theme of intrepid collectors of the nineteenth century searching the tropic jungles and mountain fastnesses for new genera or new species of known genera, but our space is limited and, as it is my object to tell you how you may grow these beautiful flowers for yourselves, I must get down to business.

Four Main Groups of Orchids

The four genera of orchids most commonly grown here are Cymbidiums, Cypripediums, Cattleyas and Dendrobiums.

The CYMBIDIUM is a cool-house orchid which will grow and flower well in open bush-houses from the vicinity of Newcastle, N.S.W., to Eden, N.S.W. Southward from this latitude they do better in a glasshouse, and in Tasmania would perhaps give the best results if some artificial heat were supplied during the colder seasons.

CYPRIPEDIUM (Slipper Orchid): This orchid has a wide range from cool, temperate, to tropic.

Generally speaking, those having solid coloured green leaves are temperate varieties, and those with mottled leaves are tropical varieties. The hybrids, however, are of such mixed parentage that the colour of the leaves is not an unfailing guide, and on the whole they should be grown under similar conditions to cymbidiums in the same locality, but they require more shaded conditions and probably more humidity than that genus.

ORCHIDS

CATLEYA: This beautiful orchid has its origin in species collected in South America. As with all other commercial orchids, hybrids are today much more popular than the species, although good varieties of cattleya species are still sought after, chiefly by hybridists who desire to impart new vigour to their seedlings.

DENDROBIUM: This genus has a very wide area of origin. Those grown for flowers may be temperate varieties such as *Dendrobium nobile*, which hails from the cool mountain areas of Northern India and Burma, or tropical varieties of which Australia has some fine native species, for example, *Dendrobium phalaenopsis* (the Cooktown orchid).

Cymbidiums — Australia's Favourites

By far the most popular orchid grown in Australia is the cymbidium. There are several very good reasons for this popularity. The genus is hardy and suited climatically to the area of heaviest population. It requires only the protection of a bush-house in most of N.S.W., South Australia, and Western Australia.

In Victoria and Tasmania a glass-house is desirable, but artificial heating is unnecessary.

The plants when well grown flower prolifically on long racemes of from 10 to 20 flowers. The flowers are very long-lasting, up to two months on the plant or more than a month if the racemes are cut and placed in a vase of water in a cool room.

These are the orchids which are exported to U.S.A. during the flush period (August, September) and earn a welcome addition to our dollar exchange.

The cymbidium is a bulbous plant; the bulbs (actually pseudo bulbs) are clothed in long, strap-like leaves, and the roots are attached to the base of the bulbs. These roots consist of a single tough fibre core surrounded by a transparent pulp, the whole being enclosed in a whitish papery skin, the outside diameter being probably one-eighth to one-quarter of an inch. The roots have many branches and at the end of each branch is the growing tip, which, in the active period, spring to autumn, is semi-transparent and faintly tinged green.

Growing Hints

Taking as a starting point a single growth, either a seedling or a shoot from a back bulb, the progression of growth would be

as follows: The shoot increases rapidly in height during the growing period (spring to autumn) and towards the end of that period thickens considerably at its base to become a small bulb. From the base of the bulblet one or more new shoots arise, which grow taller and stronger than the parent and eventually thicken and form bulbs; again shoots arise from these bulbs, which again are more robust and thicken in due course to mature bulbs, which may be from two to six inches high and are clothed in leaves two to three feet long.

The plant may now be regarded as of flowering size, and if we are to get flowers this year the racemes will appear as blunt growths from the base of the newly-matured bulbs. They may first show as early as January and may take up to six months to develop into flowers.

In the course of time, the older bulbs having produced growths and/or flowers, become defoliated as the leaves dry off; also at the same time the roots of these bulbs gradually die. They are then known as back bulbs, and when removed at repotting time may be used in the propagation of new plants, as will be explained later.

Each successive new growth as it advances develops its own root system, with the result that a large specimen plant has a dense mass of roots completely filling the pot.

Their Natural Habitat

Most of the species from which our modern cymbidium hybrids are derived are natives of a belt of South-east Asia, chiefly the foothills of the Himalaya mountains, where they grow at an altitude of four to six thousand feet above sea level at approximately latitude 28° north.

The plants are found growing in sparse forests, often in the crotch of deciduous trees, or on old tree stumps. Broadly speaking, the temperature range of the area is from 40° Fah. in winter to 90° Fah. in summer, but the plants are at times subjected to extremes and may have to withstand several degrees of frost which causes no apparent damage.

Being within the monsoon belt, they receive frequent copious waterings from rainstorms in summer and very little rain in winter, but at that season they absorb much moisture from ground mists, and the roots are often found wandering amongst damp mosses on the boles of the host trees. In these conditions roots have been recorded up

GROWING HINTS

to forty feet in length to finally enter the deposit of leaf mould at the base of the tree in search of nutriment.

In the summer season the burning light of the sun is broken by the foliage of the trees, so that the plants receive little direct sunlight. In winter the trees, being leafless, offer little obstruction to sunlight. Spring and autumn light conditions are intermediate, as the trees unfold their leaves in spring or discard them in the autumn.

The natural food requirements of the plants are obtained from the partly decomposed debris from forest trees — leaf mould, bark fragments, the droppings of birds and arboreal animals, and at times the carcases of defunct birds and insects.

Growing the plants in captivity, so to speak, we endeavour to simulate these natural conditions, and this is how we go about it:—

In the greater part of the State of N.S.W., particularly around Sydney, the plants grow perfectly in bush-houses. These houses have walls impervious to south and west winds and are provided with a roof of brush wood such as tea tree branches with the leaves beaten off. In summer the density is such that chequered sunlight is admitted, and the brush wood is greatly thinned to admit more light in winter. Similar accommodation should suffice in South Australia and Western Australia from the vicinity of Perth southward.

Cymbidiums are not very successful in Queensland — the climate is too hot for them. Some growers do manage to grow them, but it is unlikely that they ever reach the perfection attained in Sydney.

For the best results in Victoria and Tasmania a glass-house is necessary. Artificial heat is not required but is useful if available, as the plants will grow more quickly and the flowers open more readily in winter if some heat is used, but do not in any circumstances try to create tropical conditions for this genus.

In England, cymbidiums are classified as cool-house orchids, the recommended temperatures being 50° Fah. minimum in winter at night to 65° Fah. at night in summer. The temperatures are allowed to rise a good deal during the day as the sun's heat is available.

Temperature Control

It is impossible to maintain a constant minimum of 50° Fah. in unheated accommodation in Australia, but the plants suffer

no disability from lower temperatures if watering and humidity are controlled so that the glass-house is kept rather dry on cold, dull days of winter.

We receive frequent enquiries from prospective growers in Victoria who wish to have a few plants in a sunroom or glassed-in verandah. The chief objection to this culture is the difficulty in maintaining the humid conditions which are so necessary in the hotter times of the year.

The plants would be better outside in the shade of a tree during the summer if protection from wind could be provided. They could then be returned to the sunroom about mid-April for the development of the flower racemes. Whereas an experienced grower would no doubt succeed by this method, it is usually the inexperienced beginner who wants to start that way.

We have seen how shade is provided and varied with the season in bush-houses. In glass-houses shade is provided either by movable hessian or slat blinds, or by the application of whitewash solutions. If blinds are used, they should be in position during the sunny periods of the day from mid-September to mid-April, and should not be used at all on dull days in that period or for the remainder of the year.

The whitewash mixtures can be applied externally by means of a stirrup pump, commencing with a light coat about mid-September and increasing with one or more successive coats to December. The shading is then allowed to gradually wear off with the action of rain and wind, and any residue can be easily removed about mid-April.

It will be readily appreciated that in the various methods of shading used we are merely trying to follow the cycle of natural shade thrown by deciduous trees which the plants experience in their natural habitat.

Watering

Mismanagement of watering is the most frequent cause of such failures as occur in orchid culture. Watering comprises not only the moistening of the compost in which the plants are grown, but also the maintenance of the desirable humidity in the surroundings.

This humidity is achieved by spraying floors and benches between the pots as required.

The subject of watering should rightly be considered along with the accommodation provided, the porosity of the compost, and ventilation.

ORCHIDS

Assuming all these factors to be near perfect, it is still difficult to formulate rules. We cannot say, for instance, that the plants should be watered every few days at this or that season: it depends on the actual condition of the plant at the time.

During the growing period, spring to autumn, the compost should be thoroughly moistened at each watering; surplus water should drain freely from the drainage hole in the pot, leaving the compost just nicely moist, and, because in spring and autumn temperatures are not high and cause little evaporation, the soil may remain in the right condition for several days without further application of water. When, if the fingers are pushed into the soil about one inch below the surface, the soil feels dry, or barely damp, the plants need water.

As the season advances to summer and hotter weather it is necessary to increase the frequency of watering to probably one copious application early each day, with on very hot days a light application towards sundown. In the event of unseasonable cold spells at this time it is advisable to defer the job a day or two, but the plants should not be permitted to dry out too much during the active growing period.

The floors and benches should be damped down by spraying frequently and copiously in hot weather. In the cooler weather of early spring and late autumn reduce this operation and confine it to the mornings only of bright days.

During the coldest weather of winter we should try to keep the compost just per-

ceptibly damp. This is the season of minimum root activity, and much damage may result from watering too frequently, and it will be found that one good application per week or ten days will be sufficient. At this season water should be given only on the mornings of bright days. If the plants need water but the day is cold and dull, defer the job a day or so.

It must be stressed that whenever we apply water to the compost we must do the job thoroughly so that surplus water is seen dripping from the drainage hole in the pot. We rely on the drainage provided and the porous nature of the compost used to dispose of surplus moisture, so that by the cold of night the soil is well drained of any excess.

A good guide to the moisture condition of the pot is to lift it. If it is too dry it will feel light in weight. The compost in such pots has become too dry and the soil will not readily absorb moisture in that condition. The cure is to soak the pot for about twenty minutes in a bucket of water. The pot is then placed in its normal position to drain, and thereafter the soil should absorb moisture at the usual watering period; but keep it under observation — it may require further soaking treatment.

Finally, never water an already wet plant; rather remove it from the pot and examine the drainage to see why it fails to drain readily. It will usually be found that the crotching of the pot has become displaced or clogged with compost. The remedy is obvious.

Potting of Orchids . . .

The potting of the plants and the compost used now engage our attention. The compost materials most commonly used are as follows:—

TAN BARK: The spent bark from a tannery.

TODEA FIBRE: The fibrous roots of the Todea fern.

LEAF MOULD: The part-rotted deposit of leaves found beneath the trees — tea tree leaf mould is excellent; oak leaf mould is even better. There is a seemingly unjustified prejudice against pine needles and gum leaves amongst some growers.

ANIMAL MANURES: Cow manure or poultry manure is most used. The material should be at least twelve months old.

COARSE RIVER SAND or CHARCOAL: Graded to pea size.

These last two components are used only to improve the drainage qualities of the compost.

This by no means exhausts the list of possible ingredients. Dried bracken fern roots chopped into one-inch lengths has

been used successfully, and we have read of an enthusiast in U.S.A. who grows cattleyas on such unlikely material as chopped up maize hones.

The tan bark is excellent and is received in handy form for use, but bush bark from

POTTING PROCEDURE

the forests will do quite well if chopped up and left in the open to weather for a few months.

Whatever material is used, the qualities required of it are: that it will provide a firm anchorage for the roots of the plant; it will break down slowly and in so doing provide a continuous small quantity of plant food for at least two years, and, most important of all, that it will drain off surplus moisture readily.

A good compost when watered copiously should not retain any free water on top for more than a few seconds. The plants will not at any time tolerate a soggy soil.

The following is an excellent compost for cymbidiums: Tan bark, two parts; leaf mould, two parts; cow manure, two parts, or poultry manure, one part.

To this add one-sixth of the bulk of coarse sand or graded charcoal. Blood and bone manure at the rate of a heaped dessert-spoon to an eight-inch pot of material may be used in lieu of the animal manures, and we prefer it because of the improvement of the drainage which results.

All the materials should be thoroughly mixed and left in the open air to sweeten for a few weeks before using.

In potting the plants, ordinary flower pots are used. A suitable sized pot is one that will allow of two years' growth of the plant to be handled without disturbance. This will be a pot which allows a two-inch space all round between the outermost bulbs or growths and the rim of the pot when using an eight-inch pot.

A little more free space should be allowed, when potting larger plants in larger pots.

The pot should be clean, and if not new it should be scrubbed clean and left to dry in the sun before use.

To improve the drainage qualities the drain hole should be enlarged to about one and a half inches in diameter by chipping away the pot material. The bottom of the pot should be well crocked by first placing a piece of broken pot over the hole concave side down and then building up with crock material to about two inches deep over the whole area of the bottom when using an eight-inch pot. Over this drainage material a filter of tan bark, fibre, leaves or similar should be placed to stop the compost from seeping down into the drainage and clogging it.

Potting Procedure . . .

To pot the plant, first make a hillock of compost in the bottom of the pot over the filter, then hold the plant in approximately the position in which it will remain and gently rotate the pot so that all the roots are accommodated and evenly spread. Proceed to fill up with compost, working the material between the roots and giving the pot a gentle bump from time to time to settle it.

Fill to within half an inch below the pot rim, with the bottom of the bulbs buried about one inch below the surface. Before potting the plant, any defoliated back-bulbs and all dead roots should be removed. Roots that are too long to be comfortably accommodated should be cut back to a branch if possible. All freshly cut surfaces should be dusted with hydrated lime (Limil) as a precaution against rot. The compost is best used in a damp — not wet — condition.

Freshly potted plants should receive very little water on the compost for about two weeks. A light sprinkle on the surface is desirable, and the foliage should be sprayed regularly. After a period of ten to fourteen days the water is gradually increased as the plants seem to require it.

The idea behind withholding water in the early stages is that some roots are inevitably cracked in potting. These cracks seal over

naturally in a few days, but if the soil is too wet, rot may enter by these cracks and destroy most of the root system. Also at first the roots are inactive, owing to the disturbance, and there is no point in keeping the compost more than barely damp.

Repotting is undertaken after the flowering season, commencing with early flowering varieties in September and October, and completing the latest varieties by December.

Growers use the term "potting on" as distinct from repotting. This means the potting of a plant complete with its ball of roots and compost into a freshly crocked pot, usually two inches larger, the space round the plant being packed with fresh compost. This operation is generally reserved for small plants; it can be done at any time and, as no disturbance of the plant occurs, watering normal to the season may be continued.

Propagation of Orchids . . .

The subject of raising orchids from seed is quite beyond the scope of this article. Commercially, seedlings are raised by the assymbiotic method in flasks on a sterile medium of agar, with added chemical nutrients. The method involves the use of a laboratory with much chemical equipment and the maintenance of constant temperatures. For those who wish to pursue it, the subject is treated fully in the book, *American Orchid Culture*, by Edward A. White.



1: A cymbidium plant selected for division and repotting.

2: The plant removed from the pot, showing the dense root system.

3: The plant being divided. The rhizome has been severed by a knife cut between the defoliated back bulbs to facilitate separation into the desired portions.



4: The divisions of the plant with dead and surplus roots and back bulbs removed are now ready for repotting. The back bulbs have been cleaned up by the removal of all roots and leaf husks and will each be potted into a 4-inch pot as described.



5: A propagated back bulb after 12 months' growth. 6: The plant shown in (5) removed from the pot to display the strong root system which has developed. 7: A method of producing a hot-bed for the acceleration of back bulb propagation. Actually in this case a hot water circulating chicken brooder powered by a kerosene lamp is being used. The hot-bed is not necessary, but it does hasten the shooting of bulbs set out in early spring. As soon as the shoots show roots they are set out in normal compost in 4 or 5-inch pots.

We are limited then to vegetative propagation by the division of existing plants. In this operation, which is undertaken at the

normal potting time, the plant to be divided is removed from its pot and all the compost shaken out from between the roots.

SOME CYMBIDIUM SPECIES

The plant is then cut as seems natural by its appearance into divisions of two or three mature leaved bulbs, with any new growths retained but defoliated back bulbs removed. All freshly cut surfaces should be dusted with lime and each division repotted as previously described.

The back bulbs should be cleaned up by the removal of dead leaf husks and all roots, and are then potted into a well-crooked small pot — a four-inch pot for the usual two to three-inch bulb and a five-inch pot for larger specimens. They should be placed in a warm, draught-free corner and receive normal water for the season. In the course of time the growing eye at the base of the bulb will swell and develop into a shoot which, as it grows, develops also its own root system. It may reach a height of eight to twelve inches by the following spring, when the back bulb may be removed, if it comes away easily, and discarded. The bulb does not grow fresh roots of its own. As the plantlets grow they may be potted on as seems desirable, usually from four to five-inch pots, and from five to seven-inch pots.

Amongst newcomers to the orchid cult there is often confusion in regard to the terms "species" and "hybrids."

The plants as found growing wild in their native forests are species, each species usually favouring a separate locality. All hybrids have been obtained by crossing one species with another (called a primary hybrid), a species with a hybrid, or a hybrid with a hybrid. The parentage of some modern hybrids is extremely complicated, as the hybridist has made continual experiments in quest of new and better colours and forms of flowers. As an example may be cited the hybrid *Lowio-Eburneum* x *Insigne*, which was named *Alexanderi* in honour of the eminent English orchidist H. G. Alexander, who first produced it. At the first showing of a number of plants of this hybrid raised from one pod of seeds, one of the flowers was of such distinct and outstanding form that it was given the varietal name of *Westonbirt*. This *Westonbirt* variety has been extensively used in the parentage of further hybrids, and today almost all of our show quality cymbidiums have a considerable amount of *Westonbirt* blood in their make-up.

Some Cymbidium Species

Name	Chief Habitat	Altitude	Colour	Flower Size	Remarks
Eburneum	Sikkim (India)	1000 ft.	Ivory white.	3 in.	Freely used in hybridisation for its symmetrical shape. Spring flowering.
Erythrostylum	Annam	1000 ft.	White, red on lip.	3 in.	Used in hybrids for its earliness; flowers late summer.
Giganteum	Sikkim	4000 ft. to 6000 ft.	Ochre-yellow, with brown lines	3 in.	Shy to flower; flowers in autumn.
Grandiflorum	Sikkim	5000 ft. to 7000 ft.	Green, with light yellow lip.	5 in.	Freely used as a parent of hybrids; flowers in autumn.
Insigne	Annam	5000 ft.	White to orchid purple. Lip is darker, with red markings.	4 in.	The most outstanding species; flowers in spring. Most of our best orchids have some <i>Insigne</i> blood.
Lowianum	Burma	5000 ft. to 7000 ft.	Brownish green, with light yellow lip having red V shaped blotch.	4 in.	Hardy. Freely used in hybrids; flowers in spring.
Tracyanum	Burma	5000 ft. to 7000 ft.	Brown - yellow, with red lines. Lip yellow with red lines and spots.	5 in.	Flowers in autumn; used in hybrids for its earliness.

PESTS LIKELY TO WANT YOUR ORCHIDS

Pest	Damage	Remedy	When and how to apply
Snails and Slugs	Attack flowers and young shoots.	Metabait.	Whenever observed.
Scale	Reduce vigour of plant.	White oil (Alboleum or Volck). Mix according to maker's directions, and add nicotine sulphate, 1 fluid oz. to 4 gallons spray.	Spray all over plants in December (only once) after flowers are all cut. Then lay plants on their sides to dry before restoring to upright position. Select a dull day.
Thrips and Red Spider	Sap suckers; reduce the vigour of the plant.	DDT spray according to maker's directions, with added nicotine sulphate, 1 oz. to 4 gallons of spray.	Spray at any time when flowers or buds NOT in evidence at intervals of six weeks.

All crosses of the same named hybrids or species receive the same name, so that if anyone, anywhere, at any time produces the hybrid Lowio-Eburneum x Insigne its name is still *Alexanderi*.

Outstanding examples of hybrids are usually given varietal names in addition to the hybrid name to distinguish them, but as vast differences of quality and colour often occur in flowers of hybrids, even if raised from the same pod of seeds, we cannot rely entirely on the hybrid name to ensure the qualities we desire in the plants we propose to buy.

Prices of hybrids vary in proportion to the quality and rarity of the plants. Species are usually cheaper to buy, but lack the colour range and form qualities of the hybrids.

The plants flower only once each year in the period May to November, according to variety, but with a selection of varieties we can have a continuous show of flowers for six months of the year.

In common with all plant life, cymbidiums have their share of pests. Fortunately, all are easily controllable, and above we have listed the methods we have found satisfactory in combating them.

Slipper Orchids

CYPRIPEDIUM (Slipper orchids): These require more shaded conditions than Cymbidiums; in fact, they are better without direct sunlight at any time. Therefore,

select the shadiest corner of your glass-house and tack hessian to the rafters over the bench on which you grow them. As the slipper has no pseudo-bulbs, and therefore no storage for moisture and food, it requires to be watered more frequently, so that the compost is never allowed to dry out completely. With the increased water necessary, they need a more open compost than Cymbidiums, and more crocking in the bottom of the pot, which should be as small as possible to contain the roots comfortably — usually a five-inch pot for normal sized plants. The drainage hole in the pot should be enlarged. A good compost for slippers is: Tan bark, 1 part; leaf mould, 1 part; coarse sand or charcoal, 1 part. To this add about 20% of the total bulk of crushed dried leaves, oak leaves for preference. Repotting is undertaken in early spring, or as soon as the flowers are finished. Overhead watering during the period of bud formation, usually from early February, is best avoided, as the water will lodge in the axils of the leaves, where the buds form, and may rot them. At this time it is safer to water round the edge of the pot. Or, if only a few plants are to be watered, dip them for a few minutes to the rim of the pot in a bucket of water every few days.

Propagation of the plants is by division, which is made by cutting through the rhizome, or root stock, at repotting time. It is best to leave about three mature growths in each division, and to pot any odd pieces which are left over separately.

Some Cypripedium Species

Name	Chief Habitat	Altitude	Colour of Flowers	Remarks
Charlesworthii	North Burma	5000 ft.	Dorsal petal purple, remainder brown.	Flowers during April, May. Requires a small quantity of lime in compost.
Fairianum	North India	4500 ft.	White, with purple stripes.	Flowers in May-June. Requires lime as above.
Hirsutissimum	Assam and Burma	5000 ft.	Purple and green.	Flowers October - November.
Insigne	Nepal and Burma	5000 ft.	Green and brown.	Flowers April-May-June. This is the best one for beginners. There are several varieties, one (Sanderæ) being yellow.
Villosum	Burma	4000 ft. 5000 ft.	Green, brown.	Flowers May to August.

They are slow growers, but eventually these small pieces will make plants, and the main divisions should grow strongly. Freshly made cuts in the rhizome should be dusted with hydrated lime as an anti-rot precaution, and water should be applied sparingly for a week or two, as with Cymbidiums.

The culture of hybrids and species is similar, but hybrids, if of any merit, are very expensive, and the beginner is advised to stick to species. A list of the most suitable species for our conditions appears above.

Cattleya Culture

The Cattleya group originates in South and Central America and in the West Indies. There is great variation in the conditions in which different species are found; some grow at an altitude up to 12,000 ft., whilst others inhabit tropic jungles at near sea-level, where they are found attached to the upper limbs of trees, seeking the light they require.

This greatly diversified habitat makes it difficult to arrive at the ideal conditions for their culture, but when we realise that the Cattleya genus has been crossed by the hybridist with several other allied genera, the task appears overwhelming.

We have, for example, these commonly grown multi-generic hybrids: — *Laelia* x *Cattleya* equals *Laeliocattleya*; *Brassavola* x *Cattleya* equals *Brassocattleya*; *Sophronitis* x *Cattleya* x *Laelia* equals *Sophrolaeliocattleya*,

and various others between these and other combinations.

Whilst the culture is well understood, and there is a wealth of printed orchid lore on the subject, we do not seem to have the luxurious growth in the plants which commonly obtains in U.S.A. Nevertheless, isolated growers in southern States of Australia do get excellent results, and in Queensland growers are more uniformly successful.

The Cattleya requires good light at all times, and the plants should be placed as near the roof as is possible without actually burning the leaves. They are epiphytes and absorb much of their moisture from the atmosphere, which should be maintained in a humid condition throughout the growing period. In addition, they should receive copious watering on the compost in hot weather.

After flowering, which may be at any time throughout the year, according to variety, the plants usually rest for several weeks, when water should be restricted, giving only sufficient to prevent shrivelling of the bulbs. Probably a light application at intervals of fourteen days would suffice in this period.

When new growths appear, watering should be gradually increased until the flower bud is about to burst from its sheath. As with Cymbidiums, defer water in unseasonable cold spells of weather.

The recommended temperature range for the genus is from minimum 50° Fah. in winter (some authorities place it at 60°)

CULTURE OF ORCHIDS

to 75° Fah. in summer. In Brisbane and points north the plants may be grown in bush-houses, as Cymbidiums are in Sydney.

For Sydney and points south, Victoria, South Australia and the West, a glass-house would be required, with artificial heat to maintain the minimum winter temperature.

Cattleyas are subject to similar pest infestations as Cymbidiums. and excepting for the use of white oil emulsion similar remedies apply. In lieu of white oil, Clensel may be used.

The compost most commonly used in potting is todea or osmunda fibre. The plants may be grown in pots or on rafts and baskets of wooden slats. If pots are used they must be well crocked for drainage and fibre packed tightly round the roots.

The plant is located on top of the compost, with its oldest growths against the rim and the lead towards the centre. Repotting should be done at the time the roots begin to show at the base of the new growths at intervals of two or more years as the plants outgrow their old containers.

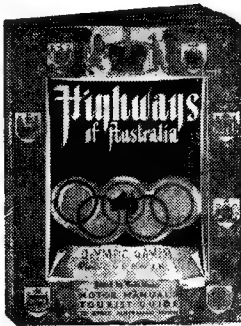
Propagation is by division of existing plants. Cut off the rearmost portion of the plant, consisting of leafless back bulbs, by severing the rhizome. Four or five green leafed bulbs should be retained on the main plant to be repotted, and the severed portion consisting of back bulbs may be used to initiate new plants. These back cuts should be cut into groups of one, two or three bulbs, according to their vigour, and should be supported in position in the pot by tying to a stake.

Dendrobiums

The genus Dendrobium comprises over 800 species, but for our purpose the beginner is advised to restrict himself to the one species, *Nobile*, of which there are several varieties. The plants should be potted in the smallest pot that will allow for two years' growth, in a compost of todea fibre, todea and tan bark, polypodium or similar. Propagation is by division, by cutting the rhizome, and repotting should be undertaken just after flowering in September-October. Dendrobiums have a definite rest period in the coldest weather, when water should be restricted — once in a fortnight will be ample. *Nobile* develops tall cane-like pseudo-bulbs, and flowers appear in groups of two or more at the nodes of the newly matured bulb. The flowers are usually white and purple, with darker purple on the lip. It requires plenty of light, air, and water during the growing period until the new growth reaches maturity; water is then restricted until after flowering, when the new growths commence to appear. During the period of restricted watering sufficient only to avoid shrivelling of the bulbs is required.

There is a wide bibliography existent dealing with the subject of orchid culture. Mighty tomes have been written on almost every phase, and world authorities often differ on minor points.

In this article we have been able to touch but lightly on the more salient features, but if we have aroused your interest, and you are successful in growing the plants, you will find orchid culture a most satisfying and possibly a profitable hobby.



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Cacti . . . ARE SO DIFFERENT

by L. M. SAUNDERS, F.R.H.S. (Vic.)

THE culture of these plants in Australia is more widespread than the average home gardener realises. There are good collections ranging from Northern Queensland to Hobart, and across to Perth in West Australia. The plants thrive much better in the warmer climates than the cool. Even in Victoria they grow much better north of the Dividing Range than south. Probably they thrive best in South Australia, where the natural limestone soil is most suited to their requirements. There are plants of almost every genera in Australia, and at least 1000 species available to collectors.

These plants are native of the Americas, many of the American deserts at one time being great lakes surrounded by vast jungles of rain-loving plants. As the climate changed and the lakes dried up, most of the forms of water-loving vegetation were unable to survive the changed conditions, while the remainder met the new aridity by discarding their leaves and reducing the surface exposed to evaporation.

Although the cactus family has descended from some group of leafy plants, it now includes few species having true leaves. Very few cacti have even rudimentary leaves, having transferred the functions to the green thickened plant body. It is believed that in the remote past this distinct and separate family of plants originated in the West Indies, where the oldest types, such as the leafy cacti (*Pereskia*, etc.), are

CACTI

found over wide areas. They are also found in the snows of Canada and all through the sub-tropical regions of the United States of America and Mexico, in the sub-tropical and tropical regions of South America, and also as far south as the snows of Patagonia. They are found in the Andes and the mountains of Mexico at heights up to 16,000 feet. Some of the species that have the most beautiful flowers come from Brazil and the Argentine regions. The plants with the largest blooms (Vining types), *Selenicereus*, come from the West Indies, while some of the most grotesque types come from the deserts of Arizona, California, and Texas.

Cacti protect themselves from the heat of the sun in many ways. Not all these characteristics are apparent in any one plant, but most have three or more, the main ones being:

1. The plant reduces the surface exposed to evaporation. An excellent example of this is the Barrel Cactus (*Ferocactus anathodes*), where a 200 lb. plant presents no less than 10 square feet of surface to the air.
2. Toughening of the skin and a reduction of the pores, which recede into the skin to form a cushion of still air as a further safeguard against the loss of moisture.
3. The waxy covering of the skin, often so pronounced as to appear as a powdery coating or bloom on the plant.

4. Fluting and ribbing of the surface to allow the plant to expand or contract as water is supplied or withheld. Tubercles or knobs take the place of ribs and serve in a like manner.
5. A special tissue of thin walled cells designed to store water for later use.
6. Enlargement of the root system in some species to store water underground. A good example of this is *Lophophora Williamsii* (Mescal Button).

The possession of these features enables cacti to survive more than one season of drought. It is during this period that the plants in their wild state flower most profusely in order to perpetuate their species, regardless of the vagaries of climate.

Another feature is that the spines in many varieties have replaced the leaves, not only to protect the succulent stems from animals, but also to act as a lath house to shelter all portions of the plant in turn. It is a noticeable feature that plants grown in the full sun have stouter and longer spines than those grown in sheltered localities. The wool found in the areoles of quite a number of species protects the new skin until it hardens and the waxy covering is formed.

Cacti listed below are considered the most suitable species to start with. The type of plant acquired depends on the taste of the individual, and a selection could be made from the following:

Type	Name
GLOBOSE <i>Mammillarias</i>	<i>Bocasana</i> , <i>Camptoticha</i> , <i>Hahniana</i> , <i>Nivea</i> , <i>Crocidata</i> , <i>Schelhasii</i> , <i>Wildii</i> , <i>Parkinsonii</i> , <i>Plumosa</i> <i>Uncinata</i> .
<i>Malacocarpus</i> <i>Rebutias</i> <i>Echinocactus</i>	<i>Apricus</i> , <i>Otonis</i> , <i>Pampianus</i> , <i>Haselbergii</i> , <i>Grasmerii</i> . <i>Miniscula</i> , <i>Fiebrigii</i> , <i>Senilis</i> . <i>Grusonii</i> (Golden Ball).
COLUMNULAR <i>Cereus</i> <i>Trichocereus</i> <i>Cephalocereus</i>	<i>Peruvianus</i> , <i>Alecriportanus</i> , <i>Serpentinus</i> . <i>Multiplex</i> , <i>Schickendantzii</i> . <i>Hendrickseniana</i> , <i>Senilis</i> , <i>Hoppenstedtii</i> , <i>Celsianus</i> , <i>Trollii</i> .
VINING <i>Aporeocactuses</i> <i>Selenicereus</i> <i>Echinocereus</i> <i>Epiphyllums</i>	<i>Flageliformis</i> , <i>Mallisonii</i> . <i>Macdonaldiae</i> <i>Grandiflorus</i> . <i>Blankii</i> , <i>Pentalobus</i> , <i>Coccineus</i> , <i>Melanocentrus</i> . <i>Crenatum</i> , <i>Ackermanii</i> , <i>Deutsche Kaiserine</i> .
BASILAVIS <i>Opuntias</i>	<i>Robusta</i> , <i>Santa Rita</i> , <i>Microdasys</i> , <i>Tunicata</i> , <i>Glomeprata</i> , <i>Rhodantha</i> .

These cacti are suitable for outdoor culture even in our Victorian climate.

One of the interesting South American cacti are the *Gymnocylciums*. These plants

are globular or flattened, the ribs raised into protuberances, pointed below as in a chin. That is why they are called "Chin Cacti." These plants grow well indoors

DESCRIPTION OF SPECIES



and flower freely in small pots. Most of the genus have heavy spines, which spread and sit close to the plant, which makes them easy to handle. Some varieties procurable locally are:—

Gymnocalycium denudatum: This plant flowers continually for about eight months. The flowers are white or pale pink, up to 2 in. long, tubular, and $1\frac{1}{2}$ in. in diameter.

Gymnocalycium mihanovitchii: Attractive small-growing species, with a dark green body with maroon markings. The flowers are an odd green colour; free flowering.

Coryphantha: This genus is composed of globular or cylindrical plants bearing large tubercles; interesting spine formation. The name means "top flowering." The flowers are medium-sized, at least 2 in. in diameter and about the same length, colours being yellow, red or purple. A few types worth procuring are named hereunder:

Coryphantha andrea: Large yellow flowers.

Coryphantha clava: The name means club-shaped.

Coryphantha Georgeiana: Large brown flowers.

Then we have *Mammillarias*. This genus is probably the most popular of all cacti. There are some 300 species in this genus. The name is derived from the tubercles or small protuberances which are regular all

over the plant. In this genus we have a very wide range of plants. As regards shape they are low, rounded, elongated or single, clump-forming, lightly spined, heavily spined, hairy or woolly. Some varieties combine three or more of the characteristics mentioned. These small plants are ringed with star-like flowers, ranging in colour through white, yellow, pink, red or magenta. Easy to grow from seed, reaching maturity and commencing flowering from one to three seasons. Listed below are a few varieties to choose from:

Mammillaria bocasana: Powder Puff.

Mammillaria camphotricha: Bird's Nest.

Mammillaria hahniana: The Old Lady of Mexico, hairy.

Mammillaria plumosa: Feather Bed.

Then we have the *Ferocactus*. The name means ferocious or fierce. These plants are globose or elongated with age. Their main charm seems to be the large spine formation. Some have large, wide recurving spines, a number of which are very colourful. The *Ferocactus* makes a good pot plant, as it grows very slowly and does not require a lot of attention. These plants grow in a good coarse sandy mixture containing limestone or chalk. They require reasonable watering during the growing season, but keep drier during the winter dormant months, especially the larger specimens.

CACTI

Small plants in four-inch pots need more water. Most of these plants are gems in a collection. Here are a few types worth growing:

Fero. Acanthodes, the "Californian barrel" cactus.

Fero. Latispinus, the "Devil's tongue" cactus — so called because of its fine wide, flat, recurving red or yellow spines. The flowers are a deep blue, and very striking in appearance.

Lobivias: A genus of small plants which grow either singly or in clusters of many heads. The main attraction is the fact that the flowers are diurnal — "day flowering" — and the colour range is very large. The name "lobivia" is a corruption of the name of the place where most of the genera are found (Bolivia, in South America). These plants are among those that are easy to grow, preferring almost full sun and plenty of water in summer to get good results.

Their Greatest Charm is the Flower

Take, for instance, the flowers of the Rat's Tail (*Apporo flagelliformis*) — they are red in colour and about 3 in. long, and last about six days; or the red trumpet-shaped flowers of *Chamaecereus silvestrii*. Then there are the bright purple flowers of *Cereus berlandieri*. The pink, green, cream flowers of the various *Phyllo-cacti*; also the red and purple flowers of the *Heliocereus*. Most of the *Mammillarias* flower profusely; they have a wide range of colours — carmine, cream, pink, red, scarlet and white. The flowers of *Notocactus* and *Echinopsis* groups are among the most fascinating, as they are more often far greater in diameter than the plant. For instance, *Notocactus ottonis* has had a flower 2½ in. in diameter on a plant about 1½ in. across. The beautiful pale mauve flowers on *Echinopsis Eyresii* are from 7 in. to 8 in. long, tubular, and 4 in. to 5 in. in diameter.

There are ten colours in the cactus range. They are: Brown, carmine, green, pink, red, scarlet, violet, white, yellow and purple, which, most people will admit, is a very extensive range for any species of plant. Providing the plants are correctly wintered — that is, just damped about once a month — then kept moist during the summer, they will more than repay the grower for his

trouble by producing more blooms than those plants which have been maltreated. One of the main reasons for not flowering is the lack of air and sun.

Cacti Culture

SUN: For miniature gardens and individual potted cacti that are kept indoors most of the time, it is advisable to place the plants out in the sun for about two hours once a week so that they can get a little of the ultra-violet light, which does not penetrate window glass. It is also a good plan to turn the plants round a little each day or two to supply equal lighting on all sides, which stops the plant from distorting. This also applies to pot plants grown outdoors.

AIR: Give your plants plenty of air. This applies to all those grown indoors or in a hothouse; even more so when the temperature of the air is warmer outside than in. A good circulation of air allows the plants to withstand even the hottest sun without burning. Bear in mind a scorched plant is no showpiece.

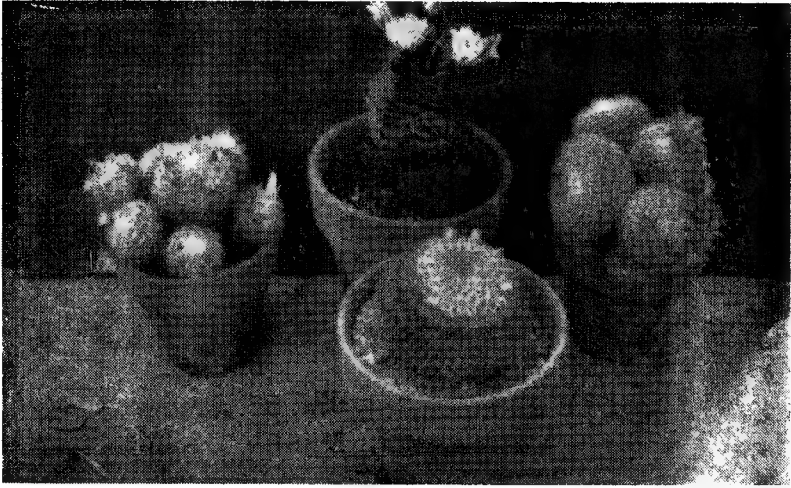
SOIL: The best general mixture is comprised of one-third coarse sand or gravel, one-third any reasonable soil, one-third compost or leaf mould; failing this, one-third sheep or cow manure. Always pot plants into a dry mixture and leave for one week before attempting to water. This allows the broken roots to heal; otherwise excess moisture causes roots to rot, often with fatal results to the plant.

Propagation of Cacti

Cacti are easily grafted, the most common one used being the flat graft or stab graft. For the first graft match the stock and scion for even size in diameter, cut the stock at the required height, and bevel edge. The same applies to the scion — place the scion evenly on the stock to exclude air. Tie down with wool or elastic bands; do not untie for at least one week. Graft in the summer months only. This method is used to force slow-growing plants; later on they are placed on their own roots.

Cacti can be propagated by offsets, cuttings or seed. Offsets and cuttings are placed on some dry sand until roots have formed before they are planted out where required. When seed is used the same procedure should be used as set out for usual horticultural practice. Excess care gives no better result than general practice. Soft seedlings brown off too easily — hardy ones are the best in the long run.

SUMMING UP



Left: *Mammillaria Bocasana*. Top: *Echinocereus Knippelianus*. Right: *Notocactus Haselbergii*. Bottom: *Mammillaria Formosa*.

To sum up: These plants require a rest period in the winter. Keep them on the dry side and protect from frost and hail and excess moisture. Plants kept in these conditions give more flowers in their season.

Remember, experience is the best teacher, and commonsense should prevail at all times. Cacti require no more attention than many other plants we grow, and the results in the flowering and the setting of seed repay the grower.

*Australia's only Complete
Guide to . . .*

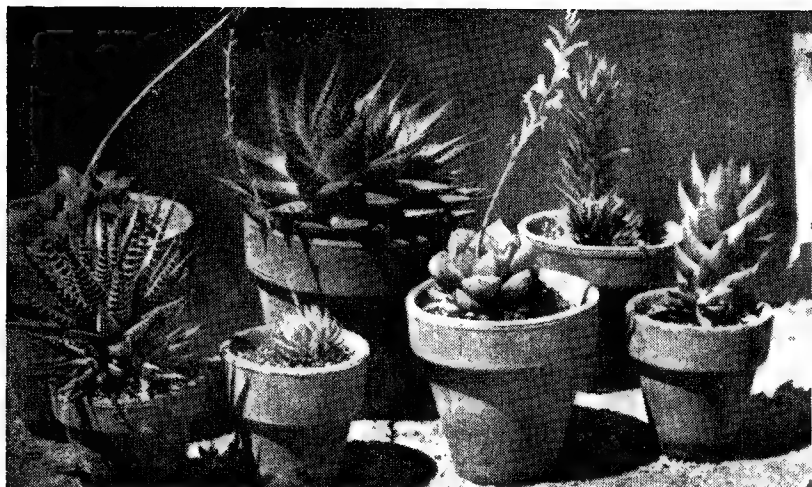


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Back Row: *H. Retusa*, *Aloe Virens*, *H. Augustifolia*.
Front Row: *H. Fasciata*, *H. Minima*, *H. Denticulata*, *H. Coarctata*.

Succulent Plants . . .

by LAWRENCE M. SAUNDERS

SUCCULENTS are plants which have juicy, fleshy stems or leaves, either or both being swollen or watery, although not all these plants store their moisture in the leaves or stems. There are quite a number which use their swollen root system to that end. The plants are constructed to maintain growth under a wide range of conditions, from cold (sub-normal temperatures) to extremes of heat, wind, excess sunshine, porous soils, and lack of rainfall. These factors have caused the modification of cell structures and plant form to meet these conditions, hence the name "succulents."

Succulents have a world-wide distribution, the greatest number coming from Africa, especially South Africa and Madagascar, then Mexico, Central America, West Indies, Europe, India, Himalayas, Japan and Canary Islands. The succulent plant group has such a wide range that it is impossible to cover them in a short article; therefore cultural notes will be of a general nature only.

There are some 16 to 20 genera and sub-genera under the above heading and a large number of species. The first group is the *Aizoaceae* (Fig. Marigold). Under this family there is the *Mesembryanthema* group, which comprises no less than 34 sub-genera and more than 2000 species. The name *Mesembryanthema* means "midday flower."

The general culture for these plants is a reasonable mixture of soil comprising one-

FORM AND HABITS

third good light loam or sand, one-third leaf mould or compost, one-third gravel or lime rubble. For potted plants general procedure is followed—some crock in the bottom of the pot, then the mixture, then the plant. Always leave at least half an inch space from the lip of the pot. There must be a good reservoir—enough to thoroughly dampen the soil. It is essential to have good drainage or the soil will stagnate, resulting in the loss of the plant. The water should percolate through the pot (4-inch) in two minutes at most. Usually the sand in the mixture takes care of this. A little water frequently is better than a flood now and again. If the soil will not grow some weeds or grass it is too dry.

The greater number of the species comes from the desert and semi-arid regions of South Africa, notably the Kalahari and Karroo deserts in Bechuanaland, also the Cape Province. The Kalahari is soil or sand not altogether sterile and in some places quite rich, only rain being required to give a fine display of flowers. The conditions are not unlike those of Central Australia, the excessive soil temperatures in these regions being rarely less than 100° Fah. The night temperature falls as low as 32° Fah., the humidity being from 10% to 20%, so that a heavy dew falls at night. This constitutes the main supply of moisture for the plants above the ground. The majority have a large root system, which penetrates deeply into the sub-soils for whatever water and nutriment is available.

Succulents have a wide range in shape, form and habit. The main distinction of the different genera can best be followed in the habit of the flowers and fruiting of each species. Some of the genera do not differ so greatly in appearance. Usually the basic form is similar, so that the average person can easily follow the group. For example, there are the *Lithops*, *Argyroderma*, *Pleiospilus* and *Glottiphyllum*. These plants have a general similarity in appearance and habit and can be divided into four groups, or, roughly, distinct classes. There are some tall ones of their type, shrubby kinds, some of which grow to a height of 3 ft. outdoors. Then we have some of the more or less procumbent or creeping types, which form small mats of plants.

The next form is a type which stay single plants all their lives, usually having

succulent bodies. Also there are a few intermediate types which form the link between the four or so main types. Most of these varieties are to be seen in any reasonable collection. One example of the taller growing plants is *Oscularea caulescens*. This forms a nice bushy plant with bluish leaves. Then there is *Hymenoclytus*, or the common name, "Pig Faces"; *Dinteranthus*, not unlike a rounded off *Argyroderma* in appearance, and *Conophytum Batesii*—this plant forms small clusters of small, roundish plants.

The following are some of the *Mesembryanthemums* worth growing in Australia:

Acrodon Subulatas: Small compact growers with a small saw-tooth on the end of the leaves. White flower with pink edge.

Bergeranthus Scapiger: A species of tuft-forming plants with triangular tapering leaves. Small yellow flower in mid-summer.

Cheriridopsis: This genus contains many plants easy to cultivate. Identified by leaf pairs emerging from the tubular dried remains of the old leaf or sleeve. *Cheriridopsis* means sleeve. There are 90 species, mostly yellow flowers, with a few exceptions. Some varieties worth growing are:

C. Richardiana, *C. Schlechteri*, *C. Herrei* and *C. Pecularis*, in appearance similar to *Pleiospilus Simulans*.

Little or no growth in autumn, mainly spring and summer, flowering in summer. Require well-drained soil, sunny position.

The *mimicry plants* are among the most fascinating of the *Mesembryanthemas* to grow, provided they receive the correct treatment. The best time for cuttings is in the spring. Place cuts on dry sand for a few weeks, then moisten with spray daily. When rooted, a little water may be given for a month or so—just enough to keep the pot moist, not wet. Do not water after flowering, resuming when the new leaf pairs have fully emerged in September or October. Remember, when in doubt do not water, as the result is usually fatal. In native habitat they have from $\frac{3}{4}$ in. to 1½ in. of rain per annum. Most of the following genera require this same treatment: *Argyrodermas*, *Conophytums*, *Dinteranthus*, *Delospermas*, *Fenestarias*, *Fritheas*, *Gibbaeum*, *Lithops*, *Ophthalmophyllum*, *Pleiospilus*, *Rhombophyllums*, *Stomatiums*, *Ti-*

SUCCULENT PLANTS

tanopsis. These plants are many and varied in shape, size, colour and flower; weird and seemingly unnatural. They require patience and restraint to grow successfully. There are many species of *Mesembryanthema*—these include the shrubby type, trailing and small clump-forming types. They grow in any reasonably sunny position.

AGAVES.—These plants grow in average soil in a sunny position. The agaves are members of the *Amaryllis* family of plants. The name means "stately." They take six to sixty years to flower and, having flowered, the plant dies. Propagation is from offsets or stolons (small plants from root extensions); also from seed capsules or bulbils which fall to the ground as young plants and take root easily. There are some fine small species as well as one only suitable for very large gardens, some of the smaller ones being *Agaves Victoria Regina*, *Stricta Filiperia*, *Geminispina*, *Trealeasii*, *Parniflora*; also *Agave Attenuata*, the only soft-leaved variety.

Stapeliads (Asclepiadaceae Milkweed Family): These plants are a challenge to those who grow them, as they require considerable experience to grow successfully. There are some 200-odd genera and at least 2000 species. Beginners should gain experience with the commoner ones before embarking on the growth of the rarer species. They require a reasonable potting mixture, a good rest in winter — almost dry soil in pots. Re-pot every two years. Give partial shade in summer. Flowers star-shaped, carrion odor, and fertilised by blow-flies.

Crassulaceae (Orpine Family):—*Anoromischus* Group: There are about 20 species in this group, the most common being *A. Poellenitzianus*, *Triflorus*, *Festivus*, *Cristatus* and *Maculatus*.

Cotyledons. — Approximately 20 species in this group also, the most commonly grown being *C. Orbiculatus*, *Gracilis* and *Undulata*. This one has large white leaves covered with a white bloom. Leaves undulated on the top.

Crassula Group: There are more than 200 species in this group, the more widely known being *Crassulas Columnaris*, *Corollata*, *Arborescens*, *Tormentosa*, *Justi-Corderoyi*, *Hemispherica*, *Teres* and *Falcata*. The

Crassulas require drier conditions to flourish — any reasonable soil.

Echevaria Group is the third in the *Crassulaceae* and is probably the largest. This group is also split into seven sub-genera — *Dudleya*, *Echevaria*, *Oliveranthus*, *Pachyphytum*, *Pachevaria*, *Stylophyllum* and *Urbinia*.

Dudleyas: There are about 80 species in this group. They come from the U.S.A. and Mexico. Many of the *Dudleyas* are not well known. The plants form into rosettes, the leaves mainly long and tapering to a point; usually covered in a white powder or bloom, the best known being *D. Pulverulenta* and *D. Farinosa*, the latter forming a plant of small white rosettes. The flowers of this group are not striking, being mainly white, pale yellow, and a few with a reddish hue. These plants thrive best in cultivation in pots in partial shade.

Echevarias: Between 90 to 100 species in this group, and it is probably one of the most colourful in both foliage and flower. Some of the hybrids are better known than the species. They are mainly rosette-forming — from ground clusters to a single rosette of leaves on one stem. They bloom all the year round and the flowers open a few at a time as the stem lengthens. Some of the most popular are *Echevaria Amoena*, *Elegans*, *Glaucia*, *Derenbergii* *Peacockii*. *Echevarias* *Leucotricha*, *Setosa*, *Pulvinata*, *Nodulosa* and *Hoveyii* have striking colour in the foliage.

Pachyphytum means thick leaves, the best ones being *Brevefolium*, *Oviferum* (egg-shaped leaves). The colour of the leaves changes with the seasons; they are at their best in winter.

Pachyvarias are mainly hybrids of *Echevarias* crossed with *Pachyphytums*.

Urbinius: These plants are native to Mexico — only five species have been described. Plants rosette-forming, soft fleshy pointed leaves with a reddish tip, long raceme of flowers. Bloom from September to November here. Two known *Urbinius* are *Corderoyi* and *Agavoides*. They are good showy plants, the former about 4 in. in diameter. Treatment the same as *Echevarias*.

Kalanchoideae (*Kalanchoe* Group): This group of the *Crassulas* embrace the *Bryo-*

VARIOUS SPECIES

phyllum and Kalanchoe. There are 20 or so species of the former. Native to Madagascar, they resemble miniature coconut palms with tubular and flat, narrow and wide to tapered foliage at the top of the stem. These plants bear the small plantlets on the leaf margins; these drop and cause a profuse reproduction of the parents. Best known here are *B. Pinnatum* *Tubiflora*. They will grow anywhere.

Kalanchoes are a fairly large genus of plants — over 200 known species. They are native to Europe, Asia, Africa and Malaya. Quite a large number of species grow in Australia, the best known being *K. Tormentosa* — fine silver-grey hairy leaves with brownish spots along the leaf margins.

Kal. Beharensis, *Marmorata*, *Blossfeldiana* and *Flammea*: These plants do best in partial shade and even temperature. They do not like frost. Light soils are most suitable.

Sedoidene (*Sedums*) *Graptopetalums*: In this group there are some of the best small rosette plants the average collector grows. Small grape-like plants, leaves elongated, usually with a reddish band or tip to the leaves. Common name "Cigar Plant." These plants vary in colour during the season. All the various species are suitable for the garden or rockery, the best being *Guatamalense*, *Pachyphyllum*, *Weinbergii*, *Amethestine*.

Sedums: Approximately 500 species, most of which will suit our climate. The *Sedum* distribution is almost world-wide, and they form the main basis of small creeping plants to fill the nooks and crevices of the rock garden. The species are so vast that it is not possible to name them here. I would suggest consulting any good succulent manual for information regarding species easily grown. *S. Sebaldii* can be recommended.

Sempervivum means "lives for ever." These small to miniature rosettes of leaves covered with webs or hairs are one of the main attractions of the shadier portions of the rock garden. They are native to the alpine portions of Europe. Many interesting species do not flower well in warmer climates. Being stoloniferous, these plants multiply into clusters easily.

Euphorbiaceae: There are some 2000 species of *Euphorbias*, the distribution being

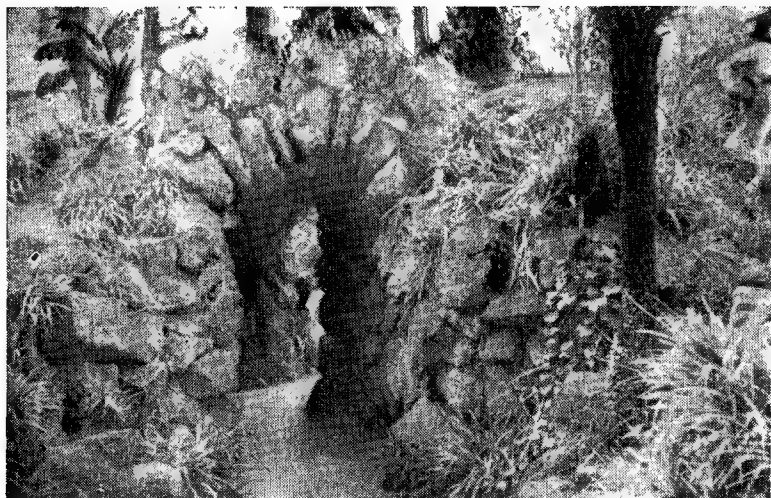
world wide. These plants are almost as widely collected as the cacti. The plants range from trees 20 ft. high to small ball-like plants 1½ in. in diameter. Most of them do very well in Australia. No succulent collection would be complete without a number of *Euphorbias*, some of the most sought after being *Euphorbia Obesa*, *Valida*, *Coerulescens*, *Grandicornis*, *Lytonia*, *Hementiana*, *Splendens* (Crown of Thorns). They require good, well-drained soil, and it is advisable to re-pot every two years.

Liliaceae (the Lily Family): In this group of plants we have the *Aloe*, *Gasteria*, *Haworthia*. These are the three main groups.

Aloes (200 species): These plants are becoming more common in collections. They are easily grown, provided the position is suitable. They need very good drainage, only rainfall, warm to hot position. The *Aloe* comes from South Africa, where conditions are flat and dry. Reproduce these and success is assured. Suitable ones for pot culture are *Aristata*, *Glaucensens*, *Setosa*, *Bequini*, *Humulis*.

Gasteria (50 species; also South African): They prefer shade and warmth to be seen at their best. Good house plants, thrive indoors. *Gasterias* are well known by their habit. Easily identified by their tongue-shaped leaves, which grow in two opposite rows. The different shape, colour and marking of the leaves are a feature of the plant. Offsets profusely from leaf cuttings. A few from which to choose are: *Armstrongii*, *Neliana*, *Brenifolia*, *Maculata*, *Verrucosa*. Require average soil.

Haworthia (200 species): These quaint rosette-forming plants with clean-cut appearance, variety of shapes and markings, are easy of culture — indoor or shaded outdoor position. They are free-flowering all seasons. The leaves vary from long tapering ones to short triangular or rounded. Some have windowed leaves that retract flush with the soil in extremely hot weather for protection. Very fine pot plants. They offset easily and prefer porous soil. Dryish conditions and partial shade give best results. There are at least 100 species available in Australia. Best known are *Haworthias*, *Attenuata*, *Margaritifera*, *Tessellata*, *Retusa*, *Coarctata*, *Cuspidata*, *Turgida*, *Setata*, *Truncata*, *Pilifera*, and many other attractive species.



Rustic Charm IN ROCK GARDENS

VARIETY and special interest can be added to your garden layout by the construction of a well-planned rockery. If located at the end of a lawn, screened by an effective grouping of shrubs, what a delightful surprise it holds for the visitor who suddenly and unexpectedly sees its impressive features!

It undoubtedly imparts a distinctive note, a gracious informality, that highlights the beauty of your flower beds, shrubberies and lawns. It may even be used to transform an unsightly corner into a charming landscape feature.

And above everything else, it is easy to construct. It will prove enjoyable work for your spare time, and will afford plenty of opportunity for skilful design and individual treatment.

Select your design carefully. Form a clear mental picture of what you desire as outstanding display features, and decide definitely the type of rockery that will be most suitable to your needs. The present lay-out of your garden will be a limiting factor. Cast your eye over your grounds and see if there is any ready-made site, any natural hillock or stone outcrop that will facilitate construction of a rockery.

Use Rocks of Varied Sizes

Aim from the outset to copy nature as far as possible. If your land is destitute of even a solitary slope, contrive to provide a convenient site by building a mound of light, porous soil.

Avoid a mechanical appearance in grouping the stones. Your rock garden must look natural as the home of varieties of plants that could not be conveniently accommodated in your ordinary flower beds or your showy borders.

Add character to the rockery by using rocks of varied sizes, with the large ones adroitly placed to emphasise some special point of interest. Do not give the impression that the rocks have been carelessly dumped from a truck.

Whether you can beautify your rockery with a winding path, or add a cascade or a waterfall, will depend on the amount of land you have available for the job. A little stream is especially desirable, particularly if it flows into a picturesque pool in one of the curves of the rockwork.

BUILDING A ROCKERY

If you can introduce a waterfall, place it part of the way down the slope. The gentle splash of the water will add its pleasant sound to the visual delight of the rockery. The water will also attract birds, and the marshy edges of the stream will provide a home for interesting bog plants.

Try to choose a location that is largely in full sunlight but has also one or two shaded portions. Remember that you will be providing for a great variety of plant life. It is unwise to have large trees nearby. They may be too overshadowing, and their extensive roots may suck out much of the moisture from your rockery soil.

Choose Well-weathered Stones

Choice of stones is highly important. They may be water-worn, rounded boulders or flat rocks — but do not mix the two types. Keeping in mind the need for naturalistic effect, choose stones that have well-weathered surfaces and the form and colour of which suggest great age. These will blend admirably in your general design. Do not use newly-quarried thin slabs or boulders that are not aged by weather. Grey, weathered faces are singularly attractive.

Water-worn limestone, soft sandstone or other porous material suits the purpose excellently. Bush sandstone, light to dark grey with yellow stainings, proves ideal for the climatic conditions of most Australian States. Avoid red ironstone, or similar rocks, that heat up and may scorch some of your plants.

Drainage is Important

Inspect the foundation of your rockery to ascertain if the sub-soil is sufficiently porous for good drainage. For it is highly essential that there should be easy seepage of water.

It may be necessary to cut a trench from 6 to 18 in. deep, and fill with charcoal or small rubble. If required, an agricultural drain can be installed to run off excess water. Cover the drainage, first with fine rubble and then with rotting leaves.

On level ground, or where the area is exceptionally dry, a somewhat similar system may be used to provide a reservoir of moisture for your plants. In this case, the agricultural drain is omitted, the collected moisture being retained by the layers of drainage material, so that the roots of the plants are well watered even during a dry spell.

Building the Rockery

Begin building your rockery by placing a row of stones at the foot of the mound of soil or natural slope. Thus you start at the lowest part and work upwards and backwards.

One-third to two-thirds of each rock should be beneath the soil surface. The important thing, however, is not what proportion of each rock is buried, but the naturalistic appearance of stability. The rocks, indeed, should seem as if connected to one another underground — as if part of a real outcrop.

To attain that natural look, study the formation of the strata of each individual rock. There must be no mixing of strata. The lines must not be horizontal in one place and vertical in another. Throughout the rockery the lines should be at the same angle. The most satisfactory effect is obtained by tilting the lines slightly from the horizontal. (See *Landscape Gardening* for illustrations.)

Catch the Rainwater

Each stone should be tilted slightly inwards so that the top surface will catch the rain and carry the moisture backward to the roots of the plants.

Each stone should lock its neighbours in position, and the soil should be firmly packed around each rock. There must be no air pockets. The main aim should be to have pockets of properly mixed soil at least a foot deep that will afford plenty of nourishment and a clear run for the plant roots. Do not use cement to bind the rocks.

The distance between each row of stones will depend on the contour of the slope. The steeper the rise, the closer will the stones have to be placed. The second row can be set about 12 in. higher than the first. Continue with the work to the desired height.

If your stones have been firmly packed it should be possible to walk over them without dislodging a single rock. There should be no "rocking."

Soil Pockets must be Level

Provide some stepping-stones to give easy access to the various parts of the rockery. If the garden is large a winding path of rough sandstone slabs may be formed. The picturesque effect can be heightened by using the path to divide the rockery into two levels.

ROCK GARDENS

Surfaces of the soil pockets must be level. If sloping, rainwater will run off the pockets, causing erosion. Level pockets, however, will ensure good soakage.

Plenty of variety in the size of soil pockets is advisable. Study the different root requirements of the plants you intend to display, and allot adequate space and depth of soil. Remember that rock garden plants root deeply. When planting, spread out the roots carefully, and be sure to firm the soil well. Water the plants immediately after planting.

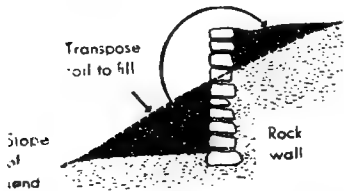
Varied Soil Requirements

With each type of plant having its individual soil requirements, make sure that you provide the proper mixture for each pocket while the construction work is in progress. For it is often difficult to make a change of soil once the stones have been placed in position.

Wide Range of Choice Plants

Choose wisely from the wide range of dwarf shrubs, alpines and perennials that are available for selection. Give due consideration to colour effects. Visualise the brilliant masses of colour that your carpeting plants can display against a background of grey, weather-beaten rocks. Cushiony plants are ideal for brightening small corners, and tufty plants are handy behind the trailers. Shrubs can be used with discretion as highlights at well-chosen spots, and a tall, erect specimen may well form the crowning glory of your display.

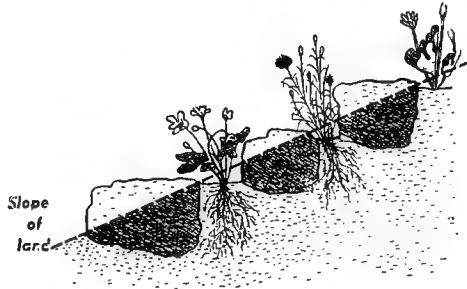
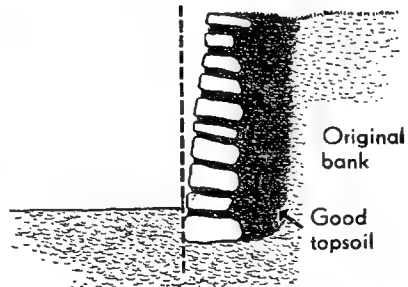
Here is a comprehensive list of plants that will help you in selecting the most suitable specimens:—



1: To get more use from a sloping lawn, level it with a retaining wall. If the wall is mortared, concentrate on spreading plants set behind it, which will soften hard top line.

2: Make sure the original backbone wall is not quite horizontal. Commence laying the wall with larger rocks, starting about 8 in. below the surface of the front bank.

3: To change a problem slope into a colourful bank, embed rocks to form a series of small plateaus. Avoid ridges across the slope by using different sized rocks. Sink back edges deeply.



ALPINES AND PERENNIALS FOR THE ROCKERY

	Height	Colour of flower	Aspect		Description
			Any	Any	
AJUGA A. reptans atropurpurea A. reptans multicolor	9 in. 6 in.	Blue Blue			Quick-growing carpeting plants. Rich bronze foliage splashed with pink and orange.
ALYSSUM (Gold Dust) A. saxatile	6 in.	Golden yellow	Sunny		Profuse flowers in spring.
ANDROSACE (Rock Jasmine) A. lanuginosa		Rose	Shaded		Silvery-white trailer.
ARABIS (Rock Cress) A. albida	6 in.	White	Hot, dry		Carpeting plant.
ARENARIA (Sandwort) A. balearica A. caespitosa	1 in. 2 in.	White	Shaded Shaded		Moss-like creeper. Bright green carpet.
ARMERIA (Thrift) A. mauritanica A. Vindictive		White Rose	Open Open		Flowers on 3 in. stems. 6 in. stems.
AURELIA (Wall Cress) A. graeca	4 in.	Deep lavender	Any		Greyish-green foliage.
CAMPANULA (Harebell) C. carpatia C. istriaca C. muralis C. isophylla alba C. isophylla mayii	6 in. 3 in. 6 in.	Blue or white Sky blue Deep purple White Blue	Cool, moist Cool Cool Cool Cool		Flower mainly in summer. Attractive foliage. Good trailing variety. Trailer with large flowers. Silvery-green foliage.
CERASTIUM (Snow in Summer) C. tomentosum		White	Open		Silver-leaved trailer.
COTULA (Lepinella) C. Hastii	2 in.		Shaded		Rich dark green creeper.
CYCLAMEN C. africanum		Pinkish-lilac and purple	Shaded		Autumn flowering.
DIANTHUS (Alpine Pinks) D. alpestris D. alpinus D. squarrosus	6 in. 2 in. 6 in.	Pink Rosy red White	{ Open Partially shaded		Cushions of moss-like foliage. Attractive variety. Deeply fringed flowers

ALPINES AND PERENNIALS FOR THE ROCKERY

	Height	Colour of flower	Aspect	Description
FUCHSIA <i>F. procumbens</i>		Yellow	Shaded	Splendid trailer.
GENTIANA (Gentian) <i>G. aculis</i> <i>G. sino-ornata</i>	4 in. 4 in.	Rich blue Dark blue	Shaded Shaded	Thrive in moist position. Immense trumpets.
GERANIUM (Crane's Bill) <i>G. sanguineum</i> <i>G. wallichianum</i>	12 in. 4 in.	Crimson-purple Violet	Open Open	Semi-trailer. Large flowers.
HELXINE <i>H. Soleirolii</i>	1 in.		Shaded	Rich green carpeter.
HERNIARIA <i>H. glabra</i>			Open	Soft green carpeter.
HOLCUS <i>H. bulbosa variegata</i>	9 in.		Open	Hardy variegated grass.
LIPPIA (Fog Fruit) <i>L. Nodiflora</i>		Pinkish mauve	Warm, dry	Dwarf creeper; makes good Alpine lawn.
LITHOSPERMUM (Gromwell) <i>L. prostratum</i>	6 in.	Rich blue	Semi-shade	Lovely carpeting plant.
LOTUS <i>L. peltorhynchus</i>		Red	Open	Silvery-leaved trailer.
MARGYRICARPUS (Pearl Berry) <i>M. setosus</i>	12 in.		Any	Low-growing evergreen.
MAZUS <i>M. rugosus</i>		Lavender	Open	Carpeting plant.
MENTHA (Mint) <i>M. requienii</i>		Mauve	Semi-shade	Creeping herb with peppermint-scented foliage.
NEPETA (Catmint) <i>N. Mussini</i>		Lavender	Open	Decorative greyish foliage.
NIEREMBERGIA (Cup Flower) <i>N. hippomanica</i> <i>N. rivularis</i>	9 in. 3 in.	Lavender Cream	Open Open	Bears masses of flowers. Creeper with large flowers.

ALPINES AND PERENNIALS FOR THE ROCK GARDEN

Height	Colour of flower	Aspect	Description
4 in. 6 in.	Rose-pink Rose-pink	{ Open or semi-shade	Mossy foliage. Very large flowers with dark eye.
9 in.	Yellow	Any	Strawberry-like silky leaves.
	Mauve		Prostrate shrub; effective on dry bank.
	White White Pink White-pink	{ Sunny or semi-shade	Forms carpet of tiny staghorns. Large green rosettes. Hairy leaves. Dense rosettes of foliage
	Rose	Open	Creepers that forms thick carpet.
2 in.	Yellow White Pink	Open Open Open	Green foliage, shaded yellow. Minute variety with bluish foliage. Flat, roundish glaucous leaves.
	Red Yellow or white Yellow	Semi-shade Open Open	Rosette-like succulents. Concave-leaved rosettes. Globular to flattened rosettes.
	Rose-pink	Sunny	Dwarf creeper.
	Lilac or purple Lilac Mauve	Any Any Any Any	Showy plant with lemon-scented leaves. Prostrate plant with caraway-scented leaves. Dense green carpeting plant. Hairy greyish foliage.
	Scarlet	Any	Trailer with brilliant flowers.
	Rich blue Gentian blue	Open Open	Lovely dwarf plant for rock garden. Profuse spikes of flowers.
	White		Trailer with glossy green leaves.

PHLOX (Alpine Phlox)
P. subulata rosea
P. subulata Sampson
POTENTILLA (Chinquefoil)
P. alpestris
ROSMARINUS (Rosemary)
R. prostratus
SAXIFRAGA (Rockfoil)
S. ceratophylla
S. cotyledon
S. Geum
S. umbrosa (London Pride)
SCHIZOCENTRON
(Trailing Lasiandra)
S. procumbens
SEDUM (Stonecrop)
S. acre
S. densifolium
S. Sieboldii
SEMPERVIVUM (House Leek)
S. arachnoideum
S. arborescens
S. globiferum
SILENE (Catchfly)
S. acaulis
THYMUS (Thyme)
T. citriodorus argenteus
T. herba-barona
T. serpyllum
T. serpyllum lanuginosus
(Woolly Mountain Thyme)
VERBENA (Vervain)
V. chamadrroides
VERONICA (Speedwell)
V. prostrata
V. Shirley Blue
VINCA (Periwinkle)
V. minor alba

SUITABLE SHRUBS FOR THE ROCKERY

	Height	Colour of flower	Aspect	Description
CISTUS (Rock Rose) C. Crispus C. sunset	2 ft. 2 ft.	Gay pink Magenta pink	Full sun Sunny	Compact, hardy dwarf evergreen. Very compact.
COTONEASTER C. microphylla C. thymifolia C. horizontalis	3 ft. 2 ft.	White White White	Any Any Any	Hardy ornamental evergreens. Dark, shining foliage. Thyme-like leaves. Foliage colours in autumn.
CUPRESSUS (Cypress) C. Lawsoniana C. argentea compacta C. torulosa aurea	3 ft. 3 ft.		Open Open	Variegated dwarf form of Lawson cypress. Dwarf golden form of C. torulosa.
CUPHEA (Cigar Plant) C. ignea	2-3 ft.	Red and black	Sunny	Dwarf evergreen.
CYTISUS (Flowering Broom) C. Donald C. Lord Lamborne C. Marie Burkwood	4 ft. 4 ft. 3½ ft.	Pink, carmine, orange Scarlet, crimson and cream Yellow, rose, crimson and gold	Open	Spreading habit. Vigorous, upright. Large attractive flowers.
DAROEZIA (Beautiful Irish Heath) D. polifolia alba	18 in.	Pure white	Moist, cool	Bell-shaped flowers.
ERICA (Heath) E. autumnalis E. Darleysensis E. melanthera E. multiflora	2 ft. 1 ft. 3 ft. 3 ft.	Deep rose-pink Rose pink Lavender purple Pink	Open Open Open Open	Autumn flowering. Winter flowering. Profuse winter flowering. Upright shrub.
DAPHNE D. Genkwa D. odora alba D. odora rubra	3 ft. 3 ft. 3 ft.	Lilac White Deep pink	East East East	Slender-branched. Lemon-scented flowers. Deliciously fragrant.
ERIOSTEMON (Native Waxflower) E. myoporoides E. obovatis	3-4 ft. 2 ft.	Pale pink Pink and white	Open Open	Hardy dwarf evergreen; very free-flowering. Star-like waxy flowers in spring.

SUITABLE SHRUBS FOR THE ROCKERY

	Height	Colour of flower	Aspect	Description
EUPHORBIA E. splendens (Crown of Thorns) E. Wulfenii	3-4 ft.	Bright red Yellow	Hot, dry Under trees	Thorn shrub: place against wall. Thrives in poor dry soil; winter flowering.
FUCHSIA F. gracilis variegata F. pumila Tom Thumb	12-15 in.	Red Red	Sheltered Sheltered	Small green leaves marked with white. Pendant-flowered dwarf variety.
HYPERICUM (St. John's Wort) H. moserianum tricolor	2 ft.	Yellow	Any	Attractive little shrub; colour green, cream and pink.
HELIANTHEMUM (Sun Rose) H. Ben Nevis		Chrome-yellow, crimson	Sunny	Free-flowering trailer.
LAVANDULA (Lavender) L. spica (Common English Lavender) L. Vera Munstead dwarf L. Stoeckii (French Lavender)	3 ft. 2 ft.	Lavender Lilac Purple	Open Open Open	Sweet-perfumed. Dwarf, bushy. Winter flowering.
PUNICA (Pomegranate) P. granatum nana	2 ft.	Crimson	Open	Hardy dwarf, fruits well.
ROSA (Rose) R. Lawrenciana R. Rouletti	9 in. 6-9 in.	Dark red Pink	Open Open	Flower during spring, summer, autumn. Double flowers.
STATICE (Sea Lavender) S. incana		Pale pink		Graceful flowers on 6 in. stems.
TEUCRUM (Germander) T. fruticans	3 ft.	Lavender	Open, dry	Silver-foliaged dwarf shrub.
THUJA (Arbor-Vitae) T. occidentalis frobelii T. occidentalis pyramidalis	3 ft. 3 ft.		Any Any	Ball-shaped variety. Hardy, upright conifer.

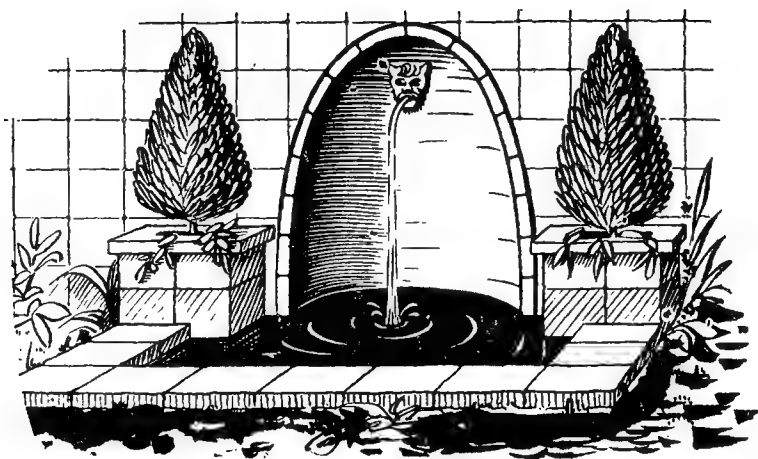


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Pools & Aquatic Plants

by DAVID MATTHEWS (Curator, Footscray Gardens)

WHETHER it be the attraction of the mirror of the water's surface with the ever-changing play of lights upon it, or to the great variety of beautiful and interesting plants that can be grown within the pool itself and around its margins, or to the happy blending of both, a water garden, properly constructed and judiciously planted, is not only a great ornament but has a fascinating attraction for all garden lovers.

Water pools for garden ornamentation should be either:

Strictly geometric in outline — so designed to suit a formal setting;

Informal in outline, with more or less natural-looking edges designed to suit the obvious informal layout of the garden;

The natural sheets of water that fit in so well with schemes of wild gardening.

Selecting the Position for an Ornamental Pool

The selected spot should be the place where one would naturally expect to find a water pool—that is, on the lower levels of the garden. One should always have to

look down on to the pool's surface; water lilies are thus also seen to their best advantage. To grow and flower water lilies to perfection the pool must get all the benefit of a full day's sunshine.

The size of the pool must, like every other important feature of the garden, be in strict proportion to the area. Careful attention should be paid to making the pool watertight, for a leaking pool will always bring more sorrow than joy. Provision must also be made for draining and refilling the pool.

The finishing of the edges, particularly of the informal pool, is most important — everything should be done to create a natural and pleasing appearance. This effect can be obtained by the use of natural rocks, placed

POINTS TO REMEMBER

so that their edges overhang the concrete structure of the pool's side walls and completely hide the concrete work. This rock should be well embedded into a cement compo, otherwise it becomes dangerous to those working about the pool's edge, by reason that if an insecure stone is stood upon it may give way and cause the person to slip into the pool. Suitable trailing plants can be planted so that they will practically cover the stone edgings. Informal pools are sometimes built with a backing to the shrubbery border; this allows scope for the planting of suitable shrubs and other plants to form a pleasing background and, if so decided, to introduce a miniature waterfall. There should also be spaces along the margin of the pool where access to the water's edge can be gained.

Depth of the Pool

Nymphaeas (Water Lilies) will be the chief flowering plants used to ornament the pool. To grow these well the pool should not be less than 2 ft. deep, unless, of course, the bottom of the pool happens to be natural clay, which would then obviate the necessity for building up a soil medium in which to grow the lilies.

For pools with cement bases, pockets of brick or stone surrounds are built in which to place the soil medium for growing the lilies. The diameter of the pockets should be 2 ft. or larger where the expanse of water will permit, and the walls of the pockets 1 ft. high, built with a few cavities in them to allow the roots of the lilies to come through; this now allows for 1 ft. of soil for planting in and 1 ft. of water above the crown of the lily plants. Nymphaeas are of varying habits — the weaker growers do very well with 1 ft. of water over their crowns, whilst the stronger ones, although content with 1 ft. of water above the crown of the plant, will also do very well in much deeper water, some varieties succeeding in up to 6 ft. of water, but for all practical purposes 2 to 3 ft. would be ample for the overall depth.

Soil Medium

Any good heavy loam will do very well. Strong loamy volcanic soils are also good, as they are not so likely to wash away from the root crowns as the sandy soils. A little well-decayed farmyard manure or bone dust can be mixed with the soil. The soil should be placed into the prepared pockets and made firm by trampling it. Throughout

the growing period of the water lilies, if extra fine blooms are desired, take some stiff loam, add some bone dust to it, and make the mixture into small bricks. Drop a few of these around the crowns of the lilies at intervals of three weeks.

Time for Planting

September and early October are the best months for planting the water lilies; also any other aquatic plants used in water gardening are generally started at that period as well, for if planted during autumn or winter many fail to start in the spring. After planting the rhizomes (thickened root growths with growing points) of the water lilies, it is wise to tie them down so that they won't float out of the soil when the pool is filled with water.

Plant Material in the Pool

Nymphaeas or water lilies are by far the most important plants for water gardens, many of them being vastly superior in beauty to most land plants.

Since the early ages men have cultivated water lilies. The starchy root growths provide food and reputed medicinal values. The water lily cult attained its maximum in the early years of the present century, when the wonderfully coloured hardy hybrid Nymphaeas reached the open market. Present-day gardeners do not pay them the attention they deserve, as few, if any, plants produce such a wealth of exquisite blooms for such scant attention as do the water lilies. They will flower even in moderate to cool climates for seven months of the year, and in warm to hot climates much longer. They prefer a still or very slow-moving water to live in, and the water, unless by some means it becomes unwholesome, should not be changed until it becomes necessary to clean out the pool and divide the plants.

Here are some good hardy hybrid varieties of Nymphaeas:—

Nymphaea Andriana: Colour, deep violet-red.

N. Atropurpurea: Deep dark red.

N. Aurora: Flowers open yellow, changing to orange, then to dark red.

N. Candidissima: Pure white.

N. Chrysantha: Yellow, changing to red.

N. Gloriosa: Rose red.

N. James Brydon: Deep carmine red.

N. Laydekeri hybrids: Small-growing types in colours of pink, red, carmine, etc.

POOLS AND AQUATIC PLANTS

N. Rosea: Pink.

Nymphaea Pygmaea: This small water lily is indeed a gem for miniature pools. It can be had in three colours—white, sulphur yellow and pomegranate red.

Nymphaea Stellata: This lovely blue-flowered variety sends its starry blooms well above the waterline. It belongs to the tuberous rooted varieties, which are not so climatically hardy as those that grow from rhizomes; however, it flowers profusely in the Melbourne district, but is late in coming into growth. Pink and white varieties are also available of the *Stellata* type.

Remember these essential points make for success in water lily growing:—

They require as much sun as possible.

Plenty of water surface, but in the interest of the general appearance of the pond do not plant them so close together that their leaves cover all the water; at least one-third of the water's surface must be free.

A sufficiency of good loamy soil not mixed with sand.

When too large, divide the plants in springtime, replacing good strong pieces of rhizomes or tubers.

Eichornia crassipes (Water Hyacinth): This interesting floating plant produces spikes of lovely lavender blue flowers during summer. The plant is in great demand by fish breeders for their fish ponds. *Eichornias*, where suited, make rapid growth and must be controlled.

Pontederia cordata and its variety, *montevidensis* (Arrow-heads) produce strong stems up to 2 ft. high, with heads of beautiful blue flowers. Plant in soil pockets with the crowns of the plant just under the water.

Cyperus papyrus (the Egyptian Paper Plant): This historic plant sends up stems to 6 ft. high, bearing graceful heads of green thread-like leaves. A fairly large pocket should be built against the inner wall of the pool, the sides of the pocket to be built to within 3 in. of the height of the pond wall. Fill this pocket with strong loamy soil and plant clumps of the *Cyperus* in the springtime. This is one of the plants that resent dividing other than in springtime.

Plants Suitable for the Margins of Pools

There can be no doubt that the marginal planting, particularly of the informal

and natural pools, with suitable associate plants will add considerably to the interest and beauty of the water garden. With regard to placing the marginal plants it is necessary to so arrange them that there is a sense of cohesion in each individual composition and throughout the general scheme. The water lilies within the pool should appear to but extend the marginal planting to the depths of the pool. Effective and suitable plants are numerous. The following list will prove helpful:—

Bambusa (the Bamboo family *Arundinaria gracilis*): A slender grower, 8 to 10 ft., very graceful, deep green foliage.

B. Sulphurea: Yellow stemmed bamboo, 12 ft.

B. Argento-striata: 4 ft., silver striped leaves.

B. Aureo-striata: 4 ft.; golden striped leaves.

Gunneria manicata (for larger pools only): This very large-leaved plant has a striking appearance and creates a diversity of foliage form that at once gives interest to the planting scheme.

Colocasia esculenta: Handsome large-leaved plant, often called Elephant's Ears; requires plenty of space.

Iris (*Iris Kaempferi*): The clematis-flowered iris of Japan. Exquisite flowers ranging in colour from white through varying shades of blue to the deepest purple; some flowers are self-coloured; others veined, spotted or blotched. This class of iris requires rich moist soil. They can be had as named or mixed varieties.

Iris Monspur: A tall-growing variety producing flowers in shades of blue and yellow.

I. Ochroleuca: A spring flowering type producing tall white and yellow flowers.

I. fimbriata: A lovely plant for cool, moist positions, giving quantities of pale lavender-coloured flowers.

Calla Lily: Clumps of the white calla lily are really lovely around the margins of the informal pool, as also is its near relation, *Richardia elliptica*, with its handsome spotted leaves and yellow flowers.

Phormium tenax variegata: For informal pools this is quite a useful plant. It is the New Zealand Flax, with golden variegated leaves.

Juncus zebhrinus (the Zebra Rush): This very pretty plant grows to 3 ft. high. Its attraction lies in the yellow margins of its leaves.

CONSTRUCTIONAL HINTS

Ferns

Ferns are good companions to waterside plants. Whilst the family as a whole enjoy moist protected positions, they will not succeed if planted in stagnant water.

The following tree ferns, *Dicksonia Antarctica* (the soft tree fern), *Cyathea Cunninghamii* (the slender tree fern), *Alsophila Australis* (the rough tree fern) can be used with good effect, especially around informal pools, while such dwarfier types as *Blechnum discolor*, *Asplenium bulbiferum* (the Mother Spleenwort), *Aspidium aculeatum* (the Common Shield Fern) and *Nephrolepis tuberosus* (the Fishbone Fern) are useful and attractive for marginal work around all but the formal pools.

Flowers in Association with Water Pools

Blue flowers are especially lovely when planted near or in association with water gardens. *Myosotis* (the Forget-me-nots), *Delphiniums*, *Campanulas* or Hare-bells, *Isotoma axillaris* and its near relations, the *Lobelias*, are all lovely blue-shaded flowers. Then there are such flowers as the *Lythrums* or, as they are better known to most of us, *Loosestrife*.

Mimulus (the Musk Flowers): Several varieties, including *Moschatus*, the trailing yellow form.

Primula: *Primula malacoides* looks very charming planted at random along the margins of informal pools; also the English Primroses (*Primula acaulis*) and *Primula Kewensis*, the lovely yellow-flowered variety with tall spikes of bloom, are well suited for this work.

Helleborus (Christmas Rose): This winter flowering perennial is content with any shady or semi-shaded nook, and gives a wealth of flowers.

Chrysanthemum leucanthemum (the Shasta Daisy or Moonflower): The moon-daisies are well worth a place, especially if given the attention of dividing them each year and planting enough sets together to form a spectacular group. The varieties: Arthur Chapman, large bold flowers, white with yellow centre; Chiffon White, with its petals finally divided.

Construction of a Garden Pool

Where artificial pools are being constructed, whether they be formal or informal in design, several factors are important. They must be watertight. Provision must be made for draining them easily and there should be an overflow pipe provided. This can be led into the drainage pipe. A simple way of providing both outlet and overflow is to lay a 2 in. galvanised iron pipe under the pool so that one end is in position for connecting the pipes to carry away the water; the other end where the sump or lowest point of the pool will be.

Construction Hints

Determine the size, shape and depth of the pool. Make the excavation necessary, allowing for depth of water, sufficient fall on the floor of the pool to drain water to the sump or lowest spot; 3 in. of ashes from a coal furnace; 4 in. of concrete.

Materials for Mixing the Concrete

Clean crushed rock of approved quality of $\frac{1}{2}$ in. and $\frac{3}{4}$ in. mixed sizes, or as a substitute good coarse clean gravel that is free from any clay or silt particles. Five parts of either of the above; clean sharp sand, two parts; approved quality cement, one part. The forms are then put into position to correct shape and height, allowing 5 in. for the thickness of the walls. There should be no need for reinforcing material. As the walls are being built up, tamp the aggregate into position with a wooden ramrod. When this layer of concrete is firmly set but still green, which should be in approximately 15 hours, strip the form boards carefully and then face the whole surface with $\frac{1}{2}$ in. of compo. made of three parts clean sharp sand, one part cement, one quart (per bag of cement) Nonporite No. 2 Paste.

Mosquito Pest

The pool will supply suitable conditions and food for many mosquito larvae to complete their life history. The usual method of pouring a small quantity of kerosene on the surface of the water to destroy them would also prove injurious to water lilies. It will therefore be better to introduce some ornamental fish into the pool. The fish usually take care of this trouble by cleaning up the larvae.



Climbers . . .

by DAVID MATTHEWS (Curator, Footscray Gardens)

CLIMBING plants are so variable in their habits of growth and many of them so highly ornamental that they cannot be overlooked when considering the plant materials for furnishing the garden. Varieties can be selected to fulfil any requirement, but careful attention must be given to the following details:—

- (a) Select a variety that will not ultimately become troublesome by its too rampant growth or its propensity for spreading by emitting growing points from its roots, as do some of the Ipomeas and Tecomas.
- (b) Climatic conditions are an important factor in all plant life, and climbers are no exception. To give satisfaction your plants must be climatically suited.
- (c) Where climbing plants are required to cling to walls or structures, varieties which produce clinging root-like appendages must be selected.
- (d) Pruning becomes essential at times to keep the growth within bounds. Evergreen varieties should be pruned immediately the flowers fade. Deciduous varieties, particularly those that flower on the new season's growth, can be pruned during late autumn. The pruning usually consists of cutting out the dead and useless wood and shortening back selected growths. The stronger the growth, the less the cutting back, should be the motto; the reason being that this tends to promote a better balance between root action and top growth, thereby giving a more satisfactory crop of flowers.

CLASSIFICATION AND USES

- (e) Climbing plants such as Climbing Roses, Tecomas, Bignonias, Solandras, and certain others will always give more flowers if the strong growths are tied down horizontally and a few inches of their tips removed. This results in the production of many lateral growths and more flowers. Some varieties of climbing plants send their growths immediately to the top of the structure or fence and cannot, without a great deal of trouble, be induced to give much lateral coverage. Clematis (practically all varieties), Mandevilla, Hardenbergias, Kennedias, and many others are sure to do this; they must be avoided where good lateral coverage is required.
- (f) Drainage and good cultivation of the soil are essential for the well-being of your plants. At least 1 ft. of good fertile soil over a suitable subsoil should be provided, and the drainage must be adequate enough to prevent any free water from remaining in the soil.
- (g) Insect pests that trouble climbing plants can be classified into the following groups: Sucking insects, such as Rutherglen Bugs, Harlequin Bugs, and the Green Vegetable Bug, Thrips, Aphids and Jassids. (These are destroyed by the use of contact sprays such as Clensel, Nicotine Sulphate, Black Leaf 40, and other prepared commercial lines.) Chewing insects, such as Caterpillars of the various kinds of moths and butterflies (controlled by poison sprays made from Arsenate of Lead or Paris Green). Scale insects are more difficult to deal with because of the outer shell-like covering that protects them (spraying with Benzole emulsion, Clensel, Volck, or White Spraying Oil is generally effective in cleaning up this troublesome pest).

Various Classification and Uses

Annual varieties and others having but a short life span:—

Cobaea scandens: A slender, hardy, quick-growing plant. The Canterbury Bell-like flowers open green, but change to purple. Very free-flowering and useful for cut flower work

Gourds: Grown for their ornamental fruits, which vary in shape and colour.

Annual plants, the seeds of which must be sown as soon as frosts are over.

Ipomoea: Plants belonging to the Convolvulus family. The annual varieties are colourful.

Ipomoea Quamoclit cardinalis: A quick grower, with pretty foliage and lovely cardinal red flowers; hence its common name, the Cardinal Flower.

Ipomoea (Scarlet O'Hara): Has rosy crimson flowers.

Ipomoea (Heavenly Blue): Intense blue.

Ipomoea grandiflora (Moon Flower): White flowers opening at night and closing about midday.

Mina Lobata: A highly decorative annual, which must be sown from seed each spring. The plants require a sunny, open spot. The flowers open red, but change to orange and cream shadings.

Maurandia Barclayana: A slender, twining plant, with pretty mauve flowers. There is also a pink form.

Nasturtium (Tropaeolum correctly): Splendid plants for mild and warmer climates; they can be had in a good range of colours. Sow in spring.

Tropaeolum canariensis (the Canary Bird Creeper): A slender-growing plant which produces a wealth of canary yellow-coloured flowers. Sow the seeds in the spring; requires warmth.

Tropaeolum tricolorum: Grown from tubers. It produces tender, twining growths which are covered with handsome flowers in shades of red, orange and purple. Plant in early spring.

Sweet Peas (Lathyrus odorata): Sweet peas still hold their popularity for garden and indoor decoration; and rightly so, for they possess all the desirable qualities needed to give them high ranking—colour, form, ease of cultivation, plus a long flowering period. They must have ample supports to cling or be tied to, and an open, sunny situation, which is all the better if protected from strong winds. A well-drained soil, moderately rich, into which has been worked a liberal dressing of lime, is desirable. Sweet peas are now divided into two main classes—the early winter flowering and the summer flowering. The winter flowering class are preferred for the warmer districts or States. They possess the waved standards, can be had in a wonderful range of

CLIMBERS

colours, and are sold under name or as mixed seeds. Sowings of this class can be made as early as December and continued until late January. The late flowering class comes into bloom in spring or early summer and is more suited to the mild or cooler climates. Sowings of this type are made in autumn or early spring. It is much more robust in its habit of growth and a long list of named sorts, comprising almost every conceivable colour, is available. To ensure good germination chip off a little piece of the outer covering of the seed without injuring the inner seed structure. This allows the soil moisture to penetrate more quickly, giving an earlier and more even germination.

Lathyrus pubescens (the Blue Perennial Pea): Blue flowers in spring.

Climbing Plants for Clinging to Walls and Structures

Ampelopsis Lowii: A small-growing type of Virginian creeper; deciduous; colours well in the autumn. Suitable for covering small areas, pillars, etc.

Ampelopsis Veitchii (Virginian Creeper): Strong-growing, deciduous climber; colours well in autumn.

Bignonia Tweediana: Lovely yellow flowers. Evergreen, hardy and useful plant.

Ficus minima (Climbing Fig): Small-leaved evergreen plant, grown for its leaf coverage only.

Ficus Stipulata (the larger-leaved Climbing Fig): Constant clipping keeps the leaves smaller.

Hedera (the Ivy): All varieties do well in moist, cool conditions. They are slow to start, but when established make vigorous growth. All are evergreen.

Hedera dentata aurea: Large leaves edged with cream.

Hedera Tricolor variegata: Small variegated leaves.

Hedera Emerald Gem: Foliage of glossy green.

Metrosideros diffusa (the small Rata Vine): An evergreen, producing red and sometimes pink flowers; prefers cool climates.

Climbers for Cool Districts: Strong Growers

Akebia quinata: Rampant evergreen twiner, with purplish-pink flowers.

Clematis montana: Pink anemone clematis.

Clematis montana (Deciduous): Fast-growing climber, producing white flowers in spring.

Clematis montana rubens: Deep pink flowers.

Clematis montana undulata: Produces silvery-pink flowers larger than the type form.

Pandorea Ricasoliana (Pink Tecoma, known also as *Tecoma Mackenii*): Semideciduous climber with large trusses of deep pink flowers.

Passiflora mollissima (Banana Passion Fruit, known also as *Tasconia mollissima*): A rampant grower with pink flowers, followed by large edible yellow fruits.

Vitis (the Ornamental Vine): Alicante Bouchet is the best variety, as the foliage turns bright scarlet in the autumn. This vine must surely rank as one of our best autumn foliage plants.

Wistaria: The best and most popular of the strong-growing climbing plants.

Wistaria Sinensis (Deciduous): Lavender blue flowers, produced in great profusion in springtime.

Wistaria Sinensis flore pleno: Same as above, only with double flowers.

Wistaria floribunda macrobotrys (often sold under the name *W. multijuga*): This form produces racemes up to 3 ft. long. Lavender blue and at times pink and white forms are available.

Wistaria venusta alba: The best white *Wistaria*.

Moderate Growing Climbers for Cool Districts

Campsis grandiflora (often listed *Tecoma grandiflora*): The Chinese Trumpet Flower. Deciduous, climbing and clinging vine-like plant, producing during the summer large orange-scarlet trumpet-like flowers. As the plant flowers on the new shoots, pruning should be done during the winter months.

Clematis: The large flowering section, when available. This variety of *Clematis* is outstanding amongst all climbing plants for beauty of flowers. They are classified into the following sections: The Florida, the Languinosa, the Jackmannii, the Patens, the Viticelli. Each section has a list of named varieties, all of which are very beautiful and free-flowering.

STRONG AND MODERATE GROWERS

Clytostoma callistigioides (listed also as *Tecoma Lindleyana*): The Argentine Trumpet Flower. An evergreen, producing lilac trumpet-shaped flowers during the summer months.

Hardenbergia (sometimes listed under *Kennedy* *Hardenbergia comptoniana*): Australian evergreen climber from Western Australia; covered in springtime with deep blue flowers.

Jasminum Mesnyi (often listed under *J. primulinum*): The Primrose Jasmine. Semi-scandent evergreen, producing sprays of double yellow flowers during winter.

Lapageria (the *Chilian Bell-flower*): A slender evergreen, taking some time to establish. The handsome wax-like flowers are bell-shaped. *L. Rosea* is pink, *L. alba* white.

Lonicera (the *Honeysuckle*): Old favourites. *Lonicera caprifolium*, pink and cream fragrant flowers; *Lonicera Hildebrandiana*, the giant-flowered honeysuckle, evergreen, producing large cream flowers which change to red; *Lonicera Sinensis*, a pretty evergreen with yellow and red flowers.

Mandevilla suaveolens (*Chile Jasmine*): A deciduous climber, producing clusters of trumpet-shaped sweet-scented white flowers throughout the summer.

Pandorea (often listed under *Tecoma* or *Bignonia* *Pandorea Jasminoides*): Evergreen climber, producing white flowers with deep red throat.

Climbers for Warm Districts: Strong Growers

Asparagus plumosa (*Fern Asparagus*): Grown for its foliage.

Antigonon leptopus: Tender, deciduous. A showy climber, flowering throughout the summer in the warm, frostless zones. It will not do as far south as Melbourne. The flowers are a pretty shade of pink.

Bignonia Cherere: A strong-growing evergreen, with large crimson bell-shaped flowers.

Bignonia venusta: A warm climate plant. Evergreen. Produces lovely orange-coloured flowers in autumn.

Bougainvillea: Lovers of warmth and sunshine. Evergreen climbers, whose chief beauty is in the coloured bracts which surround the flowers.

Bougainvillea magnifica Trailii: Strong grower, purple bracts.

Bougainvillea Mrs. Butt: Carmine-coloured bracts. This variety needs more warmth than *Trailii*.

Quisqualis indica (*Rangoon Creeper*): Evergreen. Sweetly scented flowers in shades of red, orange and pink. Requires to be planted in warm situations.

Solandra: Vigorous climbers with long cane-like stems. The large trumpet-shaped flowers are produced in summer.

Solandra grandiflora: Cream tinged with pink.

Solandra nitida: Deep yellow flowers. *Solandra* blooms always command attention.

Solanum Wendlandii: Frost-tender evergreen, producing clusters of pale blue attractive flowers. Suitable only for warm situations.

Climbers for Warm Districts: Moderate Growers

Hoya (the *Waxflower*): An evergreen with fleshy leaves and lovely heads of wax-like flowers. The *Hoya* often flowers best if grown in a large pot or tub, trained to a framework which has been placed on a protected wall. *Hoya carnosa* is the best-known variety. Pink flowers.

Jasminum (the *Jasmine*) — *Jasminum grandiflora*: An evergreen upright climber, producing sweetly scented white flowers.

Jasminum Stephanensi: An evergreen with attractive foliage and pink flowers.

Manettia bicolor: A dainty, slender climber with attractive scarlet and yellow tubular flowers; very suitable for pot work or growing up especially made fixtures. It must have a warm climate to do well out of doors.

Passiflora edulis (the *Passion Fruit*): A useful climbing plant, as it provides fruit as well as ornamental flowers. Plants worked on to stronger growing varieties of the *Passiflora* or *Tasconia* family come into bearing earlier and are more vigorous in their growth. Plant out in spring.

Phaseolus caracalla (the *Snail Creeper*): This lovely semi-deciduous climber likes a warm position. It should not be planted out until late spring. The curious curled flowers are lilac and yellow. Flowers produced during summer, and they are very fragrant.

Thunbergia Gibsoni (*Golden Glory Vine*): A slender-growing evergreen, suitable for sunny positions. The beautiful

CLIMBERS

orange flowers are produced throughout the year.

Trachelospermum (*Rhynchospermum*; *Star Jasmine*)—*T. Jasminoides*: A slender evergreen with white star-like sweetly scented flowers. Can be grown successfully either in shade or sunshine. *Trachelospermum Jasminoides variegata*. This variety is the same as the foregoing, but has variegated leaves.

Climbers for Shady Places

Asparagus plumosa: The well-known Asparagus Fern.

Asparagus tenuissimus: An African variety with light green foliage.

Clematis aristata (*Traveller's Joy*): Australian evergreen climber, with creamy white flowers.

Hedera (*English Ivy*)—*Hedera helix*: Evergreen foliage. *Hedera helix tricolor*: Evergreen with variegated leaves.

Pandorea pandorana (known also as *Tecoma Australis*): An Australian evergreen with handsome foliage. The flowers are cream-coloured with purple markings.

Sollya heterophylla (*Bell Flower*): A light-growing twining plant, giving a continuous supply of pretty blue flowers.

Trachelospermum Jasminoides: The Star Jasmine and its variegated form.

Climbers for Dry Positions

Asparagus plumosa: Asparagus Fern.

Bougainvillea magnifica: Purple bracts.

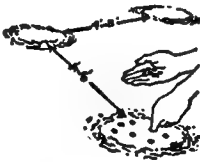
Bougainvillea magnifica Trailii: Purple bracts, better form.

Kennedya nigricans: A rapid grower with pretty pea-shaped black flowers with yellow markings.

Kennedya rubicunda: Hardy quick grower with red pea-shaped flowers.

Muehlenbreckia complexa (*Maidenhair Creeper*): A quick grower, with slender growth and fine foliage. Flowers are inconspicuous.

Pelargonium peltatum (*the Ivy Geranium*): A very showy hardy family of Pelargoniums. They flower almost continuously and can be obtained in many beautiful colours.



GROWING VEGETABLE VINES

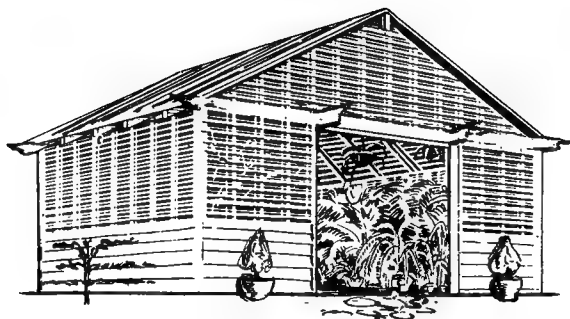
Sow seeds in hills 4ft. to 5 ft. apart. Put a shovel of manure or a handful of fertiliser to each hill. Then sow in each 8 to 10 seeds.

★

Thin, after they have grown three sets of leaves, to three or four plants. Work soil around plants.

★

Keep hoe going to rid the hills of weeds. Vines soon start crawling. Keep fruit picked; if left, the vine is apt to stop bearing.



The Bush House

by C. PLUMRIDGE

(Late Curator, Kew Gardens, Melbourne)



THE bush or shade-house, wherein may be grown more tender subjects, is usually built of wood-laths, herringbone wise on to uprights 2 ft. apart. The roof, of low pitch, or flat, which is better. A high-pitched roof allows high wind to strike down on to the plants inside, and so should be avoided. The laths, not wider than $1\frac{1}{4}$ in. and nailed $\frac{3}{4}$ in. apart. Wider laths are not advisable — by their use too much light is shut out, for flowering plants at all times must have a maximum of light. The $\frac{3}{4}$ in. spacing will allow of this maximum, though the sunlight will be broken and the plants not harmed.

The size will depend on resources and requirements of the owner. Side benches 30 inches in width, with sufficient space left to stand a few tall plants on the ground, will be found ideal. Nine feet will be high enough to hang a few baskets from. The benches are best of fibro-cement sheets, overlaid with coarse sand, fine shell grit, or, better still, fine coke-breeze. This close bench, kept damp throughout summer, will assist to maintain a constant humidity of atmosphere, also stop the draughts which the open bar bench allows. This factor alone

will conduce largely to the well-being of all the plants inside.

Flowers which Bloom Under Cover

In such a place many flowering plants will find congenial conditions — cyclamen, cinerarias, primula for winter and spring; begonias for summer; interspersed with a few ferns and foliage plants, will keep it bright and full of interest almost throughout the year.

THE BUSH HOUSE

Though often the temptation is great, not on any account should any plant, climber or otherwise, be allowed against a bush house. The risk of diminishing the amount of vital sunlight must not be taken.

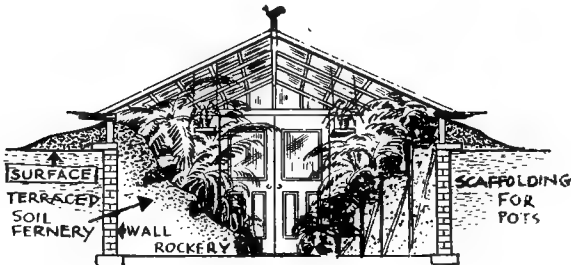
Some shrubs a few feet away to form a wind-break, and some dwarfier ones nearby, to grow no higher than the benches, are permissible; but nothing against the sides higher up.

If so desired, a small frame with a movable glass top may be on one of the benches, wherein a few seedlings can be raised or a few softwood cuttings struck. Primulas, cyclamen and the like are easy to raise from seed, and softwood cuttings of fuchsia and hydrangea are just as easy.

Soil and Other Advice

Soil suitable for bush house plants is in some localities a matter of difficulty. If not obtainable nearby, a little journey by car is always a worth-while effort to get it. Once

a little store of it is got together it will keep indefinitely. For primulas and cinerarias, etc., use fibry loam 3 parts, leaf mould 1 part, and $\frac{1}{2}$ part each of rotted cow manure and sand (creek sand). Always use the compost just nicely moist and firm it into the pots by hand or with a potting-stick. For hardwooded plants such as hydrangea and azalea add a little more sand and ram the compost in tighter. In warmer districts north of the Divide the bush house may be built wide enough to accommodate camellias, as well as large plants of azaleas and hydrangeas. These would require tubs to grow them in. Use good tubs, bored for drainage and painted inside and underneath with two coatings of bitumen paints. They will then last for years, and the plants can remain undisturbed for as long as the tub lasts. Well-established plants with plenty of room between the soil and brim of the tub would then need a top-dressing each spring—a mixture of leaf mould, some blood and bone manure for camellias and hydrangeas, and the same—but a little less—to azaleas.



This cool bush house shows how a natural fernery may be grown in terraced rock garden fashion.

Prevent pre-harvest drop from Fruit Trees

Fruit frequently falls from trees before it ripens; the drop is caused by the formation of a layer of tissue — the abscission layer is in the fruit stalk.

Much success in preventing this has been obtained by the use of hormone sprays. Since much experimental work is still being conducted, you are advised to contact the Department of Agriculture in your State regarding times of spraying, concentration and type of hormone.

Ferns . . .

IN the successful cultivation of hardy ferns, whether in free soil or pots, the several essentials are a light screen from overhead and western sun; shelter from strong draughts and north wind; ample water, and thorough drainage. No species of fern will thrive where excess of water cannot quickly drain away. In nature these are often found in more or less wet places, but in such places the water is constantly moving — there is no stagnation. The type of soil is not so urgent, though a medium porous loam is best; it need not be of much depth. Ferns are surface rooters, and are quite happy in shallow soil, with an occasional top-dressing of half-decayed material from the compost heap.

When grown in pots it is a safe rule to keep them in comparatively small pots, even to the extent of them overgrowing the pot. During warm weather vigorous plants with their pots full of roots may be stood in shallow pans of water, but care must be taken that one lot of water is taken up by the plant before the next is given; also—and this is important—the depth of drainage material in the pot must be sufficient to disallow contact of the soil in the pot with the water in the pan.

While many species are shade lovers, none will thrive in heavy shade; it is useless to expect low-growing species to thrive when planted directly under a tree fern; generally it is wise always to keep the dwarfer ones well away from the tree ferns. Our two commonest tree ferns are *Dicksonia Antarctica*, the soft tree fern, and *Alsophila Australis*, the rough tree fern. Rarer is *Cyathea Cunninghamii*, and still more rare is *Cyathea medullaris*.

For an outdoor fernery any sheltered spot of an easterly aspect will be found congenial, especially shaded by tall, lightly-foliaged trees — the silver birch is ideal, for the maximum of light can filter through the foliage without the damaging effects of the sun's direct rays. A few large and medium rocks in position—a modified form of rockery—is best, for the stones greatly help to keep the fern roots cool and moist

throughout the summer months. Whatever the soil, no lime must enter into its composition. After planting and growth has started, mulch with some leaf mould and nature will do the rest.

The obtaining of young ferns may be somewhat difficult. Nurserymen nowadays do not stock them, and it may be necessary to go for them where they grow naturally. Small plants are always the best, and a few at a time. Young plants not long out of the seedling stage can be nursed in small pots placed in a bush house, then can be planted out when established. Not all species are to be found in the same locality or under the same conditions, but a successful start with some of those most accessible and easiest to manage will be the best incentive to go after the others.

Ferns with creeping root-stocks are always best grown in free soil; except perhaps the hare's-foot fern (this makes an attractive pot plant), but the more difficult *Batwing*, or *Oak Fern*, not easily controlled, is best accommodated in a wire basket and suspended in the bush house. The *maiden-hair* — the common species is best grown in pots, as also the *Wire-ferns*, though these latter when once established in pots may be transferred to outside, but where they can well receive a little less water in late summer and autumn. Each species must almost be separately studied.

FERNS

NATIVE FERNS READILY ACCESSIBLE

Variety	Everyday Name	Suitability
ADIANTUM <i>athropicum</i>	Common Maidenhair	Pots or other containers.
<i>A. formosum</i>	Giant Maidenhair	Pots or baskets.
<i>A. hispidulum</i>	Rough Maidenhair	Pots or free soil.
ASPIDIUM <i>aculeatum</i>	Common Shield Fern	Free soil; easy to manage.
BLECHNUM <i>cartilagineum</i>	Gristle Fern	Free soil; easy; a hillside species.
ASPLENUM <i>bulbiferum</i>	Mother Fern	Pots; a very soft fern; easy.
LOMARIA <i>discolor</i>	Fishbone Fern	Free soil; easy.
<i>L. Patersonii</i>	Strap-leaf Fern	Pots or free soil; needs shelter.
<i>L. lanceolatum</i>	Lance-leaf Fern	Pots; a dainty species.
POLYPODIUM <i>billardieri</i>	Finger Fern	Free soil; robust; creeping.
<i>P. punctatum</i>	Ground Polypody	Free soil; good pot plant.
<i>P. pustulatum</i>	Kangaroo Fern	Pots or baskets; creeping.
PTERIS <i>umbrosum</i>	Shade Brake	Pots or free soil; a trade species.
<i>P. longifolia</i>	Sickle Fern	Pots or free soil; trade species.
<i>P. tremula</i>	Tender Bracken	Pots or free soil; trade species.
<i>P. incisia</i>	Batswing	Baskets; creeping root-stock.
PELLAEAE <i>falcata</i>	Short Sickle	Free soil, baskets; easy.
DAVALLIA <i>dubia</i>	Rainbow Bracken	Free soil; creeping; easy.
<i>D. pyxidata</i>	Hare's-foot	Pots or baskets; creeping; easy.
<i>D. Dicksonioides</i>	Lace Fern	Free soil; creeping; easy.
ATHYRIUM <i>umbrosum</i>	Shade Spleenwort	Free soil; creeping; shade; easy.
ALSOPHILA <i>Australis</i>	Rough Tree Fern	Free soil; robust; easy; hardy.
DICKSONIA <i>Antarctica</i>	Soft Tree Fern	Free soil; easy; shelter.
CYATHEA <i>Cunninghamii</i>	Slender Tree Fern	Free soil or pots; shelter.
GLEICHENIA <i>circinata</i>	Coral Fern	Pots or soil; not so easy of culture.
<i>G. dicarpa</i>	Wire Fern	Pots or soil; not so easy of culture.
<i>D. flabellata</i>	Fan Fern	Pots or soil; not so easy of culture.
TODEA <i>Barbara</i>	King Fern	Free soil, large pots; ample water.

PROPAGATION OF FERNS

Most species are easy of increase by means of spores — powder-like single cell organisms that form in "cases" on the under side of the fertile frond, or on an altogether separate stem.

These spores first give rise to flake-like growths called the prothallus, from which springs the true fern plant.

As the presence of water is essential to germination, whatever material the spores are sown in must be kept constantly damp;

if in pots and the compost surfaced with fine silver sand, the pots must be immersed in water until the surface is damp, then allowed to drain. When sown on shell-grit or powdered charcoal or coke, twice daily spraying with a fine syringe will forward the germination. When large enough to handle, the young ferns may be transferred to small pots.

Those with creeping root-stocks and some of the maiden-hairs may be increased by division or portion of the root-stock.

WARMTH-LOVING FERNS

The following ferns require warmer conditions than the foregoing:—

Variety	Everyday Name	Suitability
POLYPODIUM <i>Knightii</i>		Pot or basket; almost deciduous.
<i>P. glaucum</i>		Free soil; handsome pot plant.
DAVALLIA <i>Fijiensis</i>	Fijian Hare's-foot	Free soil; handsome pot plant.
<i>D. elegans</i>	Queensland Hare's-foot	Free soil; easy of culture.
ASPLENIUM <i>nidus</i>	Bird's Nest Fern	Epiphytic species; grown in pots filled with peat, moss, sand, etc.
GYMNOGRAMME <i>chrysophylla</i>	Gold Fern	{ Beautiful fern needing drier and
<i>G. argyrophylla</i>	Silver Fern	{ lighter position in pots; free soil.
OPHIOGLOSSUM <i>pendulum</i>	Ribbon Fern	Companion to the two following.
PLATYCERIUM <i>bifurcatum</i>	Staghorn	{ Epiphytes; attached to trees or
<i>P. grande</i>	Elkhorn	{ boards with copper wire; shelter.
GONIOPHLEBIUM <i>subauriculatum</i>		Handsome drooping fern.
SELLIQUA <i>caudiformis</i>	Himalayan Strap-fern	Hardy species; creeping root-stock.
CYRTOMIUM <i>falcatum</i>	Japanese Holly Fern	Free soil; easy to manage.
MARATTIA <i>fraxinea</i>	Ash-leafed Fern	Free soil only; fairly hardy.

Pot Plants . . .

. . . for Home Decoration

by DAVID MATTHEWS (Curator, Footscray Gardens)

POT plant gardening is a healthy and interesting occupation that can be followed by any person with a love for plants. There is a saying that plants grow best for those that love them most. The truth of this is most apparent in the culture of pot plants, for potted plants need constant attention to keep them in good health. Neglect them and they show it immediately. Your love for them is reflected in the health and vigour of their growth.

Potting is one of the phases of gardening that calls for skill in the nicety of handling plants, and, like every other job, whether it be gardening or of another character, it is essential that a knowledge of the fundamentals of the operations and of the materials required be possessed.

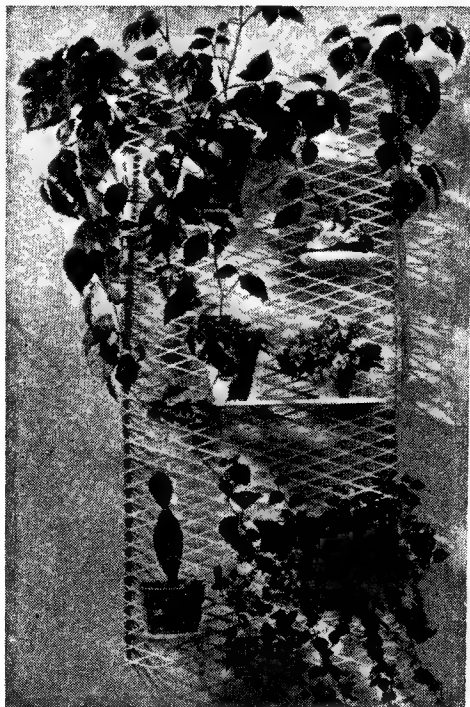
Materials

It is understood that, where the amount of potting to be done is limited to only a few plants, it would not be necessary to have a full range of materials in any great quantity. Here are some of the essentials that make for success:

A Bush House or shelter wherein the decorative plants needing protection from adverse weather can be housed. This must be free from direct draughts, as no plant will be happy where there is a strong current of air coming into contact with it. The shade must not be dense; apply just enough cover to break up the direct rays of the sun and to act as a protection against frost. When it is desired to grow the tenderer form of plants a glazed frame or glass-house, or some structure giving similar conditions, becomes a necessity.

A Potting Bench to hold the soil to be used for potting. This should be the right height for the operator and it should be covered with tin or some splinter-free material to avoid getting the operator's hands injured.

A Range of Clean Pots in various sizes, stored on suitable racks.



Your hardware store can supply a suitable background if you erect shelves for a compact setting of potted plants.

POT PLANTS

Drainage Materials

Broken pot shreds, broken bricks, coal ashes, charcoal, or coke breeze, graded into various sizes from fine to coarse by putting them through various-sized sieves or by hand grading; some well-decayed but not wholly broken-down leaves, moss, spent tan, or spent hops, for putting a thin layer over the drainage material in the pots. These materials should be kept separate and stored in bins or other convenient receptacles.

Labels, dibbles, also various blunt-ended sticks for firming the soil around the plants, are also a necessity.

Soils

Good potting soil, or rather the mediums for mixing up a batch to suit the requirements of the plants to be potted, is a must. The base of all potting soils, other than for certain plants such as certain orchids, is loam. Loam is the top few inches of fertile soils; in texture it is either light or heavy. It should not be taken from waterlogged areas, and must be free from the seeds, etc., of troublesome weeds. Loam is usually lifted with the grass remaining on it, and stacked grass downwards. Some gardeners put layers of farmyard manure between the layers. The stack is then left to mellow down before it is ready for use. It is therefore necessary to keep a supply of loam so that there will always be some available.

Leaf mould or well broken down garden refuse is a most valuable addition to the potting soil. To obtain this it is necessary to gather the leaves during autumn and stack them until decay breaks them down to a fine mould. Where there is a choice of variety, oak or poplar leaves are very good, but most other kinds can be used. Well rotted down compost from the garden refuse heap is a good substitute, but it must be thoroughly broken down, otherwise it will sour the soil.

Good clean, sharp sand; finely broken charcoal with the dust sifted out; finely broken bricks with the dust removed — to be about the same grade as the sand. These mediums are to help keep the soil free and open, so that water and air can readily penetrate the soil mass.

Farmyard manure, stable manure, cow manure, or sheep manure are all good for mixing with the potting soils. They should be carefully stacked and not used until well broken down by decay.

Bone dust is a useful medium to have on hand. A four-inch potful to each barrow-load of soil will help most plants.

Artificial fertilisers, according to the requirements of the plants to be potted, can be included if need be.

Potting Essentials

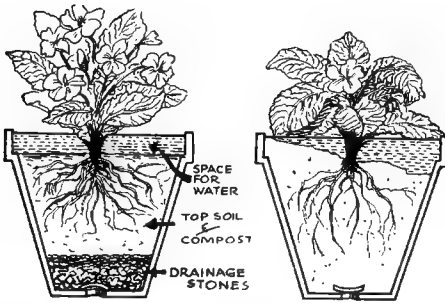
Have all materials to hand. See to it that the pots to be used are clean and dry; if they are new, stand them up and give them a good watering. Crock (drain) them by placing a piece of coarse stuff over the hole in the bottom, then covering it with a layer of the coarser drainage material. Over this put a layer of fine. This then can have a thin layer of leaf or moss material (mentioned under drainage) placed over it to prevent the soil washing down and blocking the drainage. Whilst the latter is essential, it must not be overdone. As some plants need more drainage than others, no fast rule can be laid down, but if a fifth of the total depth of the pot is taken up with drainage it should be adequate in most cases.

Mix the soil to suit the plants to be potted. A good general mixture for hard-wooded plants such as azaleas and kalmias, or for the softer-wooded plants such as daphne and hydrangea, and also for palms, aspidistra, etc., would be three parts heavy loam; one part sand, charcoal or brick dust; one part leaf mould or humus from the compost heap; one part well-decayed farmyard manure, plus one 4 in. potful of bone-dust to each barrow-load of soil. Mix these mediums thoroughly and moisten them so that they will adhere together if a handful be squeezed but when given a flick with the finger break up again.

Soft-wooded Plants

For soft-wooded plants such as pelargoniums and euphorbias, also the majority of flowering plants like cinerarias and cyclamen, together with the fern family, use the above mixture with the exception that the heavy loam is replaced by the lighter loam. Where gross-feeding flowering plants are receiving their final potting, extra manure or fertiliser can be added. There is just one important point that must be carefully watched: do not make the soil over-rich, otherwise it is likely to cause gross foliage growth at the expense of the flowers. An added stimulant can always be given when

DECORATIVE ADVANTAGES



the blooms are showing colour by applying a liquid manuring occasionally or a top-dressing of fertiliser.

Pot plants are usually grown from seed, cuttings or divisions. They are grown progressively from small plants until they are fully developed. Never put small plants into large pots; give them successive shifts each time the roots fill the pots and before the roots become potbound.

Hard-wooded Plants

Palms and many others that have reached a desired size need very firm potting. This to some extent obviates the necessity of frequent shifting to larger pots, which become a nuisance to handle.

Flowering plants such as cinerarias, cyclamen, calceolarias, etc., need the soil just well firmed with the fingers, plus giving the pot a few dumps on the bench to settle the soil evenly.

Always keep the plant centrally positioned in the pot and perfectly upright. Do not fill the pot completely with soil; leave sufficient space to hold water. After plants are newly potted they must be stood on a level surface and given a watering. They should also be kept in a rather closer atmosphere for a day or so until they pick up again.

Repotting Established Plants

Whilst spring is usually a good time to repot many plants, it is better to adopt the time when they are just pushing new growth, for that is a sign that the roots are active. Remove the plants out of their old pots carefully by turning them upside down, placing a hand under the collar of the plant to prevent it falling, then giving the rim a sharp tap on something solid. If the plant has been placed in a clean, dry pot it will

come out cleanly, but if a dirty pot has been used the roots will adhere to the sides and much damage to the roots will ensue. Shake a lot of the old soil off, remove any crocks, tease out the roots, removing any portions of them that are damaged or decayed, then repot, water, and care for in the usual way.

Plants for Interior Decoration

Few if any plants will remain healthy if left inside the living-rooms for any length of time. Therefore have a reserve stock so that they can be changed frequently. It is necessary also to keep the foliage healthy by sponging any broad-leaved plants and syringing the finer-leaved kinds. Standing house plants out in the rain is good for them, providing it is not too heavy.

Insect Pests

The following are the most troublesome:

Aphis: Dip or spray the plants with nicotine sulphate or Black Leaf 40. If dipping is the method, make a cardboard collar to go around the stem of the plant and cover the soil in the pot. Have the solution mixed and in a receptacle deep enough to take the plant. Place the cardboard collar in position, hold it with the hand, turn the plant upside down and submerge it up to the collar.

Scale Insects: Spray with benzole emulsion 1 lb. to 5 gal. of water, or wipe them off the foliage with a soft rag dipped in a weak solution of Clensel.

Thrip and Red Spider: Treat as for aphis.

Mealy Bug: This troublesome pest usually attacks the roots of the plants or gets established in the axils of the leaves and stems. If the roots are affected, a watering with a solution of sulphate of ammonia, 1 oz. to a gallon of water, to which has been added one handful of soot, will usually clean up the trouble. If on the stems, brushing them off with a stiff-haired brush or swabbing them with a solution of T.C.25 at the rate of 4 tablespoonfuls to the gallon of water will suffice.

Plants Suitable for House Decoration

INSIDE OR FOR VERANDAH WORK.—*Ardia (Fatsia) Japonica* (syn. *A. Sieboldii*) and its variegated form: Evergreen plants with large palmate leaves. Very hardy and stands shady conditions.

POT PLANTS

Aspidistra lurida and *lurida variegata*: Well-known plants that stand indoors very well. If well-grown they are worthy of a place, especially the variegated form. Do not bury the crowns too deeply when potting.

Azaleas: Lovely when in bloom. See that the new growth gets hardened off by giving the plants ample light, otherwise they will not flower well.

Ardisia crenulata: Shapely small shrub with decorative berries in red and white forms.

Aucuba Japonica and *Japonica variegata*: Shrubby plant of special value for shady places. The variegated form is especially attractive. Red berries are produced when the pollen and seed-bearing plants are grown close to each other.

Begonias: There are many varieties of begonias that can be used for pot culture. Some are grown for the beauty of their foliage, others for their flowers. The Rex varieties are handsome foliage plants, suitable for places where the light is subdued. The tree varieties are semi-scandent and are lovely subjects. Other types, such as the fibrous-rooted and tuberous-rooted kinds, are very decorative and lend themselves to pot-work.

Cyclamen: Useful winter and early spring flowering plants of great beauty. When potting take care not to cover the corm with soil. A supply of young plants raised from seed annually is necessary to ensure success.

Cinerarias: Easily managed annuals for winter and spring flowering. They are frost-tender. Grow them in moderately rich soil and do not allow them to draw up by over-shading the plants.

Fuchsias: In their many varieties, are excellent plants for pot-work. Grow them well in the open and bring them in when flowering. As verandah plants they have few equals.

Ferns are always attractive when well-grown. They require moisture and a well-drained soil that contains plenty of humus.

Adiantum (the *Maidenhair Fern*): There are many varieties. *Gracilimum* and *Nebulosum* are very fine and delicate, while *Cuneatum* is stronger and hardier and gives general satisfaction.

Nephrolepis (*Fishbone Fern*): *N. Tuberosa* and *N. Todoeoides* or *N. Marshalli* are all splendid hardy types.

Asplenium bulbiferum: Is hardy and graceful and stands well indoors.

Pteris tremula: *P. tremula* is a soft bracken-like fern. It is hardy and decorative.

Palms

Palms have been general favourites for house decoration for many years.

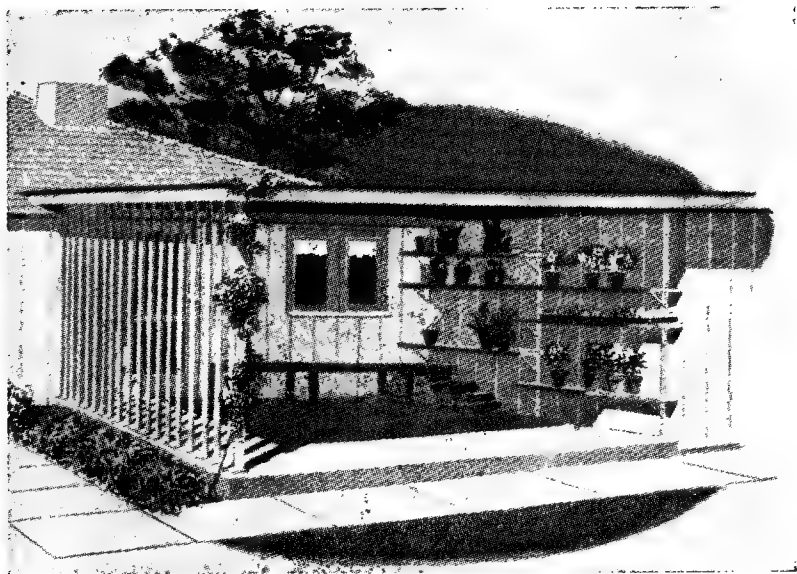
Kentia: *Fosteriana* and *Belmoriana* are both splendid hardy palms. Do not leave them indoors too long without giving them a change to fresh air and good growing conditions; keep the foliage free from dust and scale insects by sponging them.

Phoenix Roebellini: Probably the most decorative of all the hardy palms for pot-work.

Cocos Wuddeliana: Very handsome fine-foliaged palm, much hardier than most growers give it credit for, and it will grow throughout the year with bush house or verandah shelter.

Select your own seed

When you have a particularly good strain of plant, it often pays to save the seed from it. Select seed from plants which show the best overall crop of uniformly high quality, flavour or fruit. Selection from self-pollinated crops — Sweet Peas, Garden Peas, Beans, Antirrhinums, Lettuce and Tomatoes — is simple. No special precautions are needed; the seed is simply collected before it is shed. With Tomatoes, the well-ripened fruit is picked, cut open, and the pulp scraped on to a kitchen sieve and then washed while rubbing under flowing water. The seed is dried, labelled and stored. Take special precautions with cross-pollinated plants. For good setting, bag the two heads of the plants together in a fine calico or brown paper bag. Bagging is essential before the sexual organs ripen in order to prevent contamination by inferior seed from neighbouring plants. Onions, Beetroot, Parsnips, Carrots, Cabbages, Silver Beet, Petunias, Phlox, are cross-pollinated plants. Dry the seed thoroughly, dust with fungicide, and store in an airtight jar.



Glass House and Verandah Gardening

by COLIN SIMPSON (Curator, Fitzroy Gardens)

WITHOUT being biased in any way, it can be said that glass-house culture presents one of the most fascinating sides of horticulture, irrespective of whether the "glasshouse" be a glassed-in verandah or an up-to-date heated house. With little expense one may erect a small, serviceable, all-purpose glasshouse, which is used not only to raise pot plants for show and interior decorations, but is also a great medium for plant reproduction; that is, it can be used for seed-raising, the production of early seedlings (which would normally be impossible under outdoor conditions), the propagation of plant life from cuttings, grafts, etc., and a host of other purposes.

After the first sceptical start the average amateur gardener finds that it is not long before he is mastering the mysteries of glass-house culture and seeking in some way to extend his present glass-house.

Construction

The first step to consider is the best type of house to construct, presuming that it will be a glass-house in the true sense of the word and not some form of makeshift.

Firstly, the beginner would be best advised to limit himself to the unheated form of house. If this is mastered and he feels he would like to tackle some of the more difficult forms of plant life, then he can either extend or install a heating unit to the existing house.

At present there does not seem to be a standard type of glass-house set down for Australian conditions. Apart from a number of commercial firms who have erected houses

GLASS HOUSE AND VERANDAH GARDENING

to suit their own particular line of trade, too much faith has been placed by the amateur, and also many Government and semi-Government bodies, in the European conception of a glass-house. The main object of these European houses is to catch the maximum amount of light and sun heat available, and at the same time provide conditions suitable for plant culture.

With our longer hours of sunshine and higher temperatures, together with a generally drier atmosphere, it will be seen that some modification is necessary. Therefore the area of glass must be limited, the glass itself whitened for a greater part of the year, and provision made for shades or blinds to be used during the summer months.

Before proceeding further it would be advisable to give the reader some picture of a standard English or European glass-house, and use this as a gauge in comparing what is necessary for his own Australian conditions. These houses are literally glass from ground level to ridge pole, the use of timber or metal bearers being merely a medium to hold the glass in position. This style is at present being imported in pre-fabricated form, and for those who do not wish to do their own building these could easily be modified to reach our Australian conditions.

The ideal all-purpose house will be provided with ample ventilation both in the roof and side walls. The side ventilators, which will be of glass, will be provided with shutters which may be clipped on over the glass during the summer months. This means that the roof will contain the only glass to allow sun and light through.

If possible, the ends and side walls are best constructed of brick or concrete. The least amount of timber used will save endless repairs later. Owing to the humid conditions and the amount of water used, the life of timber is limited.

The roof should be just high enough to allow for convenient working. A high-pitched roof will tend to draw, and so produce "leggy" or spindly plants.

The benches should be made of a solid material with a suitable number of drainage holes in it. These benches should be covered with clean shell-grit or coarse sand to stand the pots on. During summer months the sand and shell-grit should be moistened regularly to create a moist or humid atmosphere. The top of the benches should be about 6 in. below the base of the side

vents. This would make them approximately 2 ft. 6 in. above floor level. Actual measurements for a useful all-purpose house would be:—Brick or concrete base from ground level to base of side vents, 3 ft.; side vents, 2 ft.; floor level to ridge pole, 8 ft. 6 in. A house 15 ft. wide will allow for two side benches and one centre bench, with paths between just wide enough to be comfortable. Length of the house will, of course, depend on the ground available to the builder, but 20 to 25 ft. is suggested as a nice size. If possible, the glass-house should be erected running north and south. This will ensure a more even distribution of sunlight on both sides of the house. Although this may sound unimportant, it can make quite an appreciable difference in the growth of plants.

Provision of Shades

Shading is particularly important, especially during the summer months. Not only must the glass be whitened, but blinds should be provided to reduce the severe rays of the sun on hot days. The best type of blinds are made with inch-wide laths, fastened together with metal clips, and leaving a space of 1 in. between them. The blinds should be erected on bearers about 1 ft. above the glass. This permits a current of air to flow between blind and glass. On very hot days it will be found necessary to shade for several hours during the morning and the greater part of the afternoon. As the sun passes over the house it will be found that the blinds on the eastern side may be rolled up, leaving the western blinds to do the shading. These blinds are active not only during the summer; in the winter months they may be rolled down on both sides of the house as a protection against frosts.

Painting the Glass

Never paint the glass on the inside of the house, and never use an oil paint, as it is too difficult to remove during the winter months. There are many preparations which may be used, but a white cold-water paint bound with a little linseed oil is as good as any. After heavy rains always check the roof to make sure the whitening has not been completely washed off.

Floor of Glasshouse

Although it may look tidy, do not have a solid floor of concrete, as this tends to create a dry atmosphere. A floor of clean cinders or coarse gravel is ideal; it can be kept moist to create a good atmosphere.

POTTING AND PROPAGATION

Glass Frames

These, built on to the outside walls of the glass-house, will provide a "growing on" space and help to ensure a continuous show inside. In fact, some plants will do better in these frames during their infancy than in a spacious house. The frames are simple to construct. The side of the glass-house will act as the back wall. The ends and front wall may be of brick or timber. The front will be 15 in. above ground level, and the frame rise to 24 in. at the back. Glass sashes of a convenient size to lift may be made to cover the top — 3 ft. wide by 4 ft. 6 in. is a good size.

What to Grow

With the aid of the glass frames an almost complete show of flowers or foliage throughout the year is possible. It will be understood that, whilst one group of plants is showing at its peak, something else will be reaching maturity in the frames or glass-house. If we take this cycle of production through the months we will find what to grow and when to commence producing it.

Hydrangea Potting and Propagation

Commencing in December, it is found that the hydrangea is at its best. Actually this plant commences flowering in early summer. Some people have not considered the hydrangea as a pot plant, and will be amazed at the size of bloom and variation of colour that can be obtained. Propagation of these plants commences in September and October. Soft-wood tip cuttings are taken from stems which will not produce a flower head. If a flower head is present it will be felt or seen between the top leaves. The cutting should be about 4 in. long, the base of which has been cut off just below a leaf joint. Remove the two base leaves close to the stem. The cutting is then ready to be placed in its pot. Taking a 3 in. pot and placing some drainage material such as charcoal or ashes in the bottom, it should then be filled with a mixture of sandy loam and coarse sand (three parts loam to one part sand) to within a quarter of an inch of the top. A thin layer of coarse sand should be placed over the top of this. One cutting should be placed in the centre of each pot, firming the soil well round it. Place the pots close together in the glass-house or frame and water well. The cuttings should be covered with paper rested on sticks just above the cuttings. Remove the

papers nightly, replacing again in the mornings. After about 14 days the paper should be left off altogether, replacing it only if the foliage be limp during the heat of the day. Spray the foliage with water several times during the day. When well struck the plants should be repotted into 5 in. pots and placed in the open garden in a semi-shaded position. In late winter and early spring repeat again, placing the strongest plants into 7 in. pots and the smaller into 6 in. pots.

(See also Pot Plant Section.)

Lobelia Sapphire

This should not be confused with the little compact variety, Lobelia Crystal Palace, which is used for edging and rockeries. Sapphire produces long trails of starry blue flowers up to 2 ft. in length. The seed should be sown in early April in seed pans or boxes. Place ample drainage in the bottom of the box, fill to within half an inch of the top of the box with good light loam, level off carefully, then lightly firm. Over the soil sprinkle a fine layer of clean washed sand. Sow the seed fairly heavily on to the sand, but do not cover the seed in any way. Water the seed carefully, as the seed is very fine. Next place a sheet of glass over the box and cover with a sheet of paper. Immediately after germination remove the glass and paper.

When the young plants are nicely established they should be pricked off into boxes in little clumps of six to eight plants. As soon as these clumps have developed sufficiently they may be potted into 3 in. pots, using a light loam, and when the roots are through to the edge of the pot they are ready for final potting into either 5 in. pots or 15 in. baskets. The final soil should be a little heavier, containing leaf mould and manure. One clump is sufficient to each 5 in. pot, but five clumps are necessary to fill a basket. When the lobelia commences to hang over the edge of the pot or basket, weak feeds of liquid manure may be given every 10 to 12 days. Continue feeding until the plants reach their maximum length, or until the first flowers are produced, then stop feeding altogether.

Coleus

Of the foliage plants the coleus is unbeatable during the hot summer months. They are easily produced from cuttings taken from good stock. Although the coleus may be raised from seed easily, the colour

GLASS HOUSE AND VERANDAH GARDENING

range is very poor, being mainly greens and dull reds. There are about four or five good varieties, ranging from gold and green through red to deep purple. It is best to obtain one young plant of each from a reliable nurseryman, and from these any number can be produced readily. When the plants reach a height of 6 to 8 in. the tops may be cut out as cuttings, making them 3 to 4 in. long. These will strike very quickly in sand and loam, placing one cutting to each 3 in. pot.

When the roots are showing through the soil, pot into 5 in. pots. Repeat this process until the plants are in their final pots of 6 in. or 7 in. The soil should not be too rich for the final potting, as rich soil robs the plant of its rich colour. Do not let the mature plants flower; the flowers are insignificant and rob the plants of their beauty. If a flower spike appears, pinch that particular stem back several joints. This will send out several new joints. The coleus love light, so should be grown under clear or near-clear glass. They do not like the cold, so on chilly days the vents on the glass-house should be closed down, leaving just a little ventilation on the roof vents.

In an unheated house the charm of these plants is lost in the winter. It is advisable to discard all but two of each variety, and treat these with care during the winter months. They will produce new stock for the following season.

Begonias

Tuberous begonias are perhaps the most handsome of all pot plants. They produce large camellia-like blooms of many colours, ranging from white to cream, yellow and orange, through many shades of the palest and deepest of pinks to deep rich red. Their flowering period is from late January to early April, with March being their best month. Many owners of glass-houses used to consider the tuberous begonia too difficult a subject, and for that reason left them out of their collection. But this is not so. Admittedly they require more attention than some plants, but the reward is well worth waiting for. It is advisable to grow only the named varieties, as it is no harder to produce than the poorer quality raised from seed.

The actual work commences in September. It is then that the tubers are brought out from their resting period. They are first started in boxes or seed trays. Making sure the boxes have ample drainage, fill them with a good light open soil. Next

set the tubers in the soil, with the tops just showing above soil level. Place the boxes in the glass-house or frame, but do not water immediately. Let the soil dry out completely before giving the first water. Many tubers are lost through over-watering. The tuber is a reservoir, just like the dahlia, and until root growth takes place the water is of no great help. After the first watering let the soil dry again completely. Repeat this operation until good top growth and root action is noticeable. A tuber may produce more than one growth, but it is advisable to limit the plant to one strong stem. The other growths may be taken as cuttings. When the growth appears strong and sturdy it is ready for its first potting. It would then be about 4 in. high. If the plant is really sturdy it should go into a 6 in. pot, but if there is any doubt place it in a 5 in. pot. In all pottings keep the tuber as near to the surface as possible. The begonia likes plenty of air during the growing period, and also a moist atmosphere, so open up the ventilators and keep the floor in between the pots dampened. Spray the foliage lightly with water first thing in morning and again at dusk.

The final potting into 8 in. pots will take place when the roots have nicely reached the edge of the 5 or 6 in. pots. Once again keep the tuber well up, and firm the soil, but not too hard. During the growing period of the begonia be careful at all times not to over-water. As the first flowers appear they should be removed, for they sap the strength of the plant. Several weeks after final potting a little soot may be added to the water. When the plant appears strong and well-developed, allow two flower buds to develop. As these develop it will be found that the main bud has a smaller bud on either side of it. These smaller buds should be removed as soon as they can be handled, to let the main flower develop to full size. Nearly all the begonia blooms will need staking to show off their real beauty. An occasional feed of liquid manure during the flowering period will keep up the size of bloom. The pendulous varieties of tuberous begonia must be included in every collection, as well as some of the single-frilled forms. They are grown by the same method as the former.

The soil mixture for the final potting is important, and where possible the following ingredients should be used:—Three parts of fibrous mountain soil, two parts of oak leaves, one part of sandy loam, one part of

SOME SUITABLE VARIETIES

sheep manure, one-half part of coarse sand. Through this mixture a dusting of lime, bone dust and superphosphate should be added, also one-half part of crushed charcoal.

During the growing and flowering period keep a sharp look-out for the white butterfly. This leaves behind it a small green grub which can do a great amount of damage before being found. It is advisable to spray fortnightly with D.D.T. during growth to prevent this.

After the flowering season the waterings should be gradually reduced until the plant is completely dried off. Then the tuber should be knocked out and stored away for next season.

Cineraria grandiflora

Sow the seed in December, and when the young plants are large enough to handle they are pricked off into seed trays. Until final potting the cineraria can be grown in the frame. First potting is into $3\frac{1}{2}$ in. pots, using a light loam. From the moment of pricking off until just before flowering they require regular spraying overhead two or three times a day if possible. The plants must be kept growing continuously, so re-pot as soon as necessary. Second potting goes into 5 or 6 in. pots, whilst for final potting use 9 in. pots. Allow plenty of room between the plants and give them plenty of air. Several feeds of liquid manure will help greatly as the flowers are developing. As with begonias, spray regularly with D.D.T. for grubs and aphids. Sanico or T.C.25 is recommended. Several sprayings with Folidol will eradicate any leaf minor present in the foliage. Be very careful when handling the spray.

Flowering period for the cineraria is from July to September.

The Cyclamen

This is a slow grower and will take a little more attention. The flowering period is quite long, being from May until September, and sometimes even longer. The house conditions need to be fairly close, especially during early growth. As the plants progress so does the application of air with the aid of the ventilators.

Seed is sown in February, and as the young plants grow they are transferred to their various-sized pots, the stages from the seed box being to 2 in. pots. From these they go into $3\frac{1}{2}$ in., and then to 5 in. pots. Some good results are obtained in these, but it is best to make the final potting into

6 in. pots, with a few of the strongest into 7 in. ones. The cyclamen likes plenty of fine overhead spray right up until the flower buds appear. The main thing to watch when potting is to see that the corm is kept well above the soil. This is most important. After final potting, remove the first flowers as they appear. This is done by giving the flower stem a sharp pull upwards. Never pick a cyclamen flower leaving a short piece of stem, as this will rot into the corm. Feeding occasionally with liquid manure pays dividends. This can be done just before the first flower buds appear, and several times during flowering.

The Schizanthus

The "poor man's orchid" is possibly one of the easiest of pot plants to grow, yet it is one of the most colourful, each plant producing hundreds of gay flowers in a wonderful range of colour. They flower from September to November.

The seed is sown in April, and after germination the growth is extremely rapid. The various stages of potting are from 2 in. pots to 6 in., then final potting in 9 or 10 in. ones. After final potting the plants will require staking. Conditions in the glass-house are all the air possible, combined with clear glass. The schizanthus are gross feeders, so after the plants are well settled in their final pots they may have a little liquid feed at each watering until they are almost in full bloom. An easy way of doing this is to put a pinch of blood and bone in each can of water.

The schizanthus also makes a beautiful basket subject. Place five plants in a 15 to 18 in. basket and treat the same as the upright plants. Watch for mildew during growth, and if present dust with flowers of sulphur.

As the grower tries and masters these various plants he gains confidence, and is looking for fresh fields to conquer. It is then that he may like to evolve some heating method, or, better still, construct a smaller house which can be devoted to stove plants only. Gloxinias, orchids (some of which may be grown in the cool house), tropical plants, winter begonias, poinsettias, frangipani, gardenias, and many others may then be grown.

Confidence may be gained by visiting various nurseries, whether they be commercial, Government or municipally operated, and seeing what can be done with a little care, patience, and a great amount of common sense.



A landmark of coral pink is this flowering peach in Melbourne's Botanic Gardens.

No Garden is Homely ... Without Trees

by C. PLUMRIDGE (late Curator, Kew Gardens, Melbourne)

TREES are ever a first-thought planting for landscape effect, for shade, and wind-break. The choice in each case depends on taste, as well as environment and soil conditions. Whatever the purpose, soil condition is the first care; most important is that it be well-drained; if not naturally so, then made so by one or more artificial drains. For it is useless to expect trees to thrive where excess water cannot move away freely.

Planning Procedure

On deep, fertile soils little preparation is needed; 4 ft. each way square, dug spade deep, is sufficient. On poorer, shallow soils the removal of the subsoil — not the clay — and the addition of some good loam is more than worth while. Where there is gravel overlaying clay it is best to take out all the gravel as well as sand and replace with loam — the top three inches of pasture

land, grass and all, is ideal. The removal of any clay merely results in catch-pits for water. On hillsides the planting must be level, either by cutting into the high side or — which is better — building up the lower side and banking up with stones or timber. When planting, the young tree must not be put in any deeper than it had been in the nursery; this is always clearly indicated by the soil-line just above the

POINTS TO REMEMBER

roots. All broken roots must be trimmed off neatly with a sharp knife, the rest straightened out evenly, and some nice fine loam packed firmly in amongst the roots. Finish off by forming a shallow basin to hold a bucket of water to settle the soil. If wet weather is likely to follow, the soil must be left so that water will run off.

Any stakes needed should be driven in prior to setting the plant and the roots arranged accordingly. Driving stakes in after planting may injure the roots.

Always tie the young tree firmly to the stake — loose tying usually results in chafing the bark. Of course, during the growing season the tree will need to be examined occasionally in case it is cutting into the growing stem. The best tying material is thick soft twine; if hard twine is used it is necessary to wrap a small piece of hessian round the stem before tying.

During the first two or three summers, water must be given during dry spells. It is then wise to form a basin round the plant and fill this with straw or some such material to check evaporation; otherwise the waterings must of necessity be more frequent.

Choosing Garden Trees

Selection of trees is important. Deciduous trees especially should have one straight stem or lead; any with a tendency to grow away from the vertical, as is frequently the case with the Pin-oak, should be rejected. Trees in tins or other containers are now offered for sale for planting during the growing season, but this is not good planting, for the roots are bent and twisted in the container and it is almost impossible to straighten them in planting. When planting the double-blossom peach, those not "worked" or grown on peach seedling stocks must also be rejected. Some growers work them on to plum stocks, and these never make satisfactory trees.

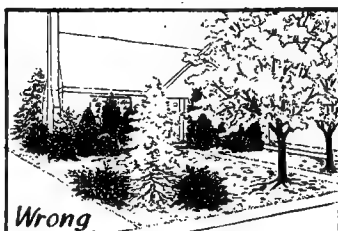
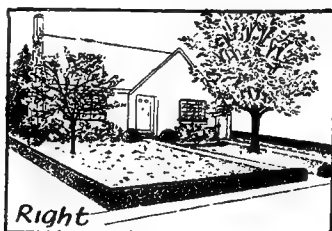
Some Pruning Tips

As a rule tall-growing trees need little if any pruning. Many, as the oak, elm and liquidambar, are always most pleasing to the aesthetic eye when grown to a single straight lead, but subjects of lesser stature may be allowed to break into several leads 6 or 7 ft. from the ground. "Blossom" trees should be encouraged to break about 2 ft. from the ground.

These "blossom" trees are frequently planted in places where they overgrow their allotted space; then some cutting back may be necessary. But such pruning is to be done immediately the blossoming is finished; the tree then has the whole of the growing season to make the new growth for the next blossoming. At the same time, whatever pruning is done, the double-flowering cherry (or any kind of cherry) must never have the leads shortened. The first year or two a little pruning is necessary to form the required number of leads; these then must be left to extend without interference till the tree is full-grown.

Evergreen Trees

Evergreens are always planted out of containers or in a ball; i.e., the plant dibbled out of the ground with a ball of soil and wrapped in hessian. The planting of these latter is simple — merely opening the ground, already prepared, and dropping the plants in without removing the wrapper. New roots quickly push through the decaying hessian and take hold of the soil. With plants in pots a little more care is needed, for the roots are so often wound round the inside of the pot and need to be unravelled. This is best done by using a pointed stick (like a lead pencil) and spreading out the roots in a slightly downward direction, taking care that the soil is kept intact. As with deciduous trees, ever-



Don't plant trees where they will obscure your windows when they mature.

NO GARDEN IS HOMELY WITHOUT TREES

green must be kept at the same level as previous to planting, and the same after-treatment is advisable.

Never at any time plant any tree or shrub that has become pot-bound without disentangling the roots, even if it is necessary to cut some in order to free the rest. If, after straightening them out, any are too long, it is much better to shorten them than to bend them in the hole.

Trees planted in a pot-bound condition rarely if ever make a root system that will ensure a secure anchorage for the future tree.

Pines, Conifers, etc.

Pines, cedars and other conifers that are badly pot-bound may have the outer roots pared off cleanly with a sharp knife. They will take no harm, especially when planted early in the season. Later, if hot sunshine is likely to ensue, a light overhead screen will be of help to them until growth starts.

In good soils no manure is necessary at the time of planting. In poorer soils a handful of blood and bone manure will be appreciated by the young tree; it should be mixed in with the top layer of loam, never buried under the roots.

Be Wary of Frost

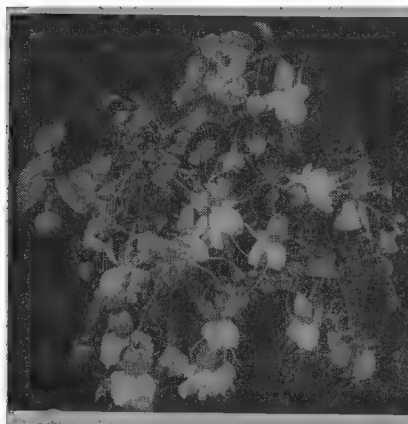
A few species are frost-tender for the first three or four years after planting. The

greatest sufferers are jacaranda, tristania and Grevillea robusta. A light overhead screen of brushwood is generally a sufficient protection, to be removed as soon as all danger of frost is over.

Foliage Denotes the Season

The colouring of autumn foliage is not equally attained in all districts. In higher altitudes only are the richest of the reds and yellows to be seen. Although several factors enter into the make-up of autumn colour, it would seem that the earlier approach of sharply cool nights has the greatest influence on its intensity. In lower districts colour comes a little later, and rarely attains the glories of the more favoured districts. Disappointment is often expressed because of failure of certain trees to reproduce colour expected of them, especially so the liquidamber and pin-oak. The fact is that these two trees are invariably grown from seed and, no matter what the subject is, all reproductions from seed vary, often widely, in form and constitution. Where it is possible to grow 10 or 12 of either or both of the above-mentioned trees this fact would become very evident, even to the amount of autumn colouring. At the same time it must be kept in mind that the same tree that fails to please in one place would colour well in a higher altitude.

Trees most noted for autumn colour are ash, maple, liquidamber, pin-oak, the rowan, rhus, and Spanish chestnut.



Double Fuchsia



Bauhinia Scandens

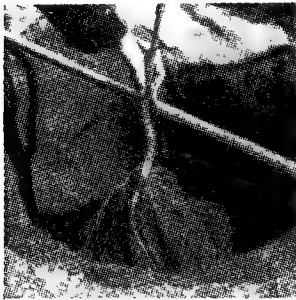
Planting Trees STEP by STEP

First essential is a wide, deep hole, into which suitable top soil for the plant is placed, plus humus or compost to feed it. If you are digging the hole in a lawn, use hessian to hold the removed earth, so it will not spoil the level of your lawn. If the roots are wrapped in hessian, do not remove it until the tree is in place in the hole, full of water. The best time to plant is during leaf-drop, or in spring a few weeks before the buds burst.



1:

If you have to delay planting a batch of trees, dig a trench big enough to hold them all in a row. Cover or "heel in" roots and part of stems with loose, moist soil. This protects your trees until you can plant in permanent locations. If you needn't delay planting more than a day and a half, store trees in a cool spot, open the bundle of wrapped plants, and moisten the roots. Keep the young trees entirely covered with moist burlap or cloth.



2:

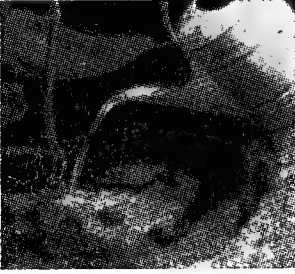
Choose a site that is sunny most of the day and protected from wind. Dig a hole that will hold roots without cramping. Keep topsoil and subsoil in separate piles on canvas or burlap. Using a tool handle as a straightedge, take out soil until you can set tree at the level it formerly grew. Add topsoil to form a cone in bottom, and set tree. Turn until bottom limb points north—so it will shade trunk.



3:

Spread the roots over the soil cone gently, like the spokes of a wheel. If one or more are cramped for space, gouge out a pocket in the side of the hole to make room for them. When you have spread out all roots evenly, cover them with topsoil you have left.

PLANTING TREES



4:

Fill hole with water. Rock tree gently back and forth to settle wet soil at roots. While water soaks in, mix a cupful of complete plant food and several shovelfuls of compost with your pile of subsoil. Fill in the hole with this mixture. Leave a slight depression at the tree base to help catch extra water.



5:

Nursery plants are delivered with labels wired around a limb, sometimes tightly. Be sure to unwind this wire so you prevent it from cutting and damaging the bark. If you want to use the label temporarily, attach it again, taking care to wind it very loosely around a branch. It's well to make a record of your permanent plantings on paper. Then you can always locate plants readily.



6:

Use a hand-pruner or sharp knife to cut off unwanted limbs and to head back. Two limbs shown were too close together. Cut branch back half-way to a bud facing away from tree. Cut leader or main stem back so it's about 16 inches taller than the south-west branch. Make cut on leader within $\frac{1}{4}$ inch of a bud facing south-west. New branches will form later—you can select about five or six spaced in upward spiral. Dwarf fruit trees will require pruning more frequently than standard kinds.



7:

In hot climates, wrap the tree trunk with a commercial tree wrap, several thicknesses of newspaper, or cardboard. This wards off sunscald, and helps keep borers out of the bark of the tree. Be sure to extend the wrap about 2 inches below soil and up to the first limb of newly-planted tree.

DECIDUOUS TREES

Botanical Name	Popular Name	Height Ft.	Habit	Foliage	Flowers, etc.
ACER A. negundo A. argentum A. aureum	Canadian Maple Ghost Tree	30-40 25-30 20-25	Spread Spread Spread	Green Silver Gold	
AESCULUS A. hippocastanum A. carnea	Horse Chestnut Horse Chestnut	40-50 40-50	Spread Spread	Green Green	White flowers Pink flowers
BETULA B. alba B. pyramidalis B. urticaefolia B. purpurea	Silver Birch Upright Birch Cutleaf Birch Purple Birch	30-40 25-30 25-30 25-30	Spread Upright Half Spread Half Spread	Green Green Green Purple	Silvery bark Silvery bark Silvery bark Silvery bark
CATALPA C. bignonioides		20-30	Spread	Green	White flowers
CEDELA C. chinensis	Chinese Cedar	25-40	Spread	Green	Leaves pink in spring
FAGUS F. sylvatica F. purpurea F. tricolor	The Beech Copper Beech Variegated Beech	30-40 20-30 15-20	Spread Spread Spread	Green Purple Purple, rose, white	
FRAXINUS F. excelsior F. aurea F. ornus F. oxycarpus F. Raywoodii	English Ash Golden Ash Mediterranean Ash Desert Ash Claret Ash	40-50 20-25 25-30 25-30 20-25	Spread Spread Spread Wide Spread Spread	Green Golden Green Green Green	
KOHLREUTERIA K. paniculata	Golden Rain Tree	20-25	Spread	Green	Yellow flowers
LABURNUM L. vulgaris	English Laburnum	16-20	Half Spread	Green	Bright yellow flowers
LIQUIDAMBAR L. styraciflua		25-30	Half Spread	Green	

DECIDUOUS TREES

Botanical Name	Popular Name	Height Ft.	Habit	Foliage	Flowers, etc.
LIRIODENDRON <i>L. tulipifera</i>	Tulip Tree	30-40	Half Spread	Green	Green, yellow, orange
MELIA <i>M. azedarach</i>	Indian Cedar	25-30	Wide Spread	Green	Light blue
PAULOWNIA <i>P. imperialis</i>		20-25	Spread	Green	Violet; conspicuous
PISTACIA <i>P. chinensis</i>		20-25	Spread	Green	Nut-bearing
PYRUS <i>P. aucuparia</i>	Rowan Tree	20-25	Half Spread	Green	Red fruit in panicles
POPULUS <i>P. alba</i>	Silver Poplar	40-50	Wide Spread	Silvery green	
<i>P. balsamifera</i>		40-50	Upright	Silvery green	
<i>P. monilifera</i>	Canadian Poplar	40-50	Spread	Green	
<i>P. monilifera aurea</i>	Golden Poplar	40-50	Spread	Golden	
<i>P. deltata</i>	Lombardy Poplar	60-80	Upright	Green	
<i>P. yunnanensis</i>	Chinese Poplar	50-60	Spread	Green	Red leaf and stalk
QUERCUS <i>Q. robur</i>	British Oak	40-50	Wide Spread	Green	
<i>Q. palustris</i>	Pin-Oak	40-50	Spread	Green	
<i>Q. rubra</i>	Red Oak	30-40	Spread	Green	
SALIX <i>S. babylonica</i>	Weeping Willow	30-40	Wide Spread	Green	Young wood golden
<i>S. vitellina</i>	Golden Willow	30-40	Wide Spread	Green	
<i>S. viminalis</i>	Basket Willow	30-50	Wide Spread	Green	
<i>S. coerula</i>	Eat Willow	30-40	Wide Spread	Green	
TILIA <i>T. platyphyllos</i>	Linden	30-40	Spread	Green	Flowers sweet
ULMUS <i>U. campestre</i>	English Elm	40-60	Wide Spread	Green	
<i>U. Louis van Houtte</i>	Golden Elm	20-30	Spread	Golden	
PLATANUS <i>P. orientalis</i>	Plane Tree	30-50	Wide Spread	Green	

TREES FOR SHELTER

Botanical Name	Popular Name	Height Ft.	Habit	Foliage and Use
EUCALYPTUS E. botryoides E. corycalyx E. corynocalyx nana E. cornuta E. robusta E. sideroxylon E. gomphocephala E. viminalis	Mahogany Gum Sugar Gum Dwarf Sugar Gum Vate Gum Swamp Mahogany Ironbark Tooart Manna Gum	30-40 40-50 16-20 20-30 40-50 30-40 40-60 40-50	Dense Clean limbed Bushy Bushy top Spread Dense Dense top Dense; spread	One of the best for south of the Divide. Hardy, useful tree; fast-growing; stands lopping. Excellent wind-break. Likes a moist soil; inland. Wet country. Stony country north of Divide; also mallee sand. Does well in hot dry areas; excellent firewood. Beautiful white bark; excellent shade.
CUPRESSUS C. lambertiana horizontalis	Lambert Cypress	40-60	Very dense Great spread	Fast growing; wind-break and shade tree.
PINUS P. insignis P. canariensis	Pine Canary Island Pine	60-70 50-60	Tall and dense Dense	One of the fastest growing shelter trees. Excellent tree; slower growing than insignis.
LEPTOSPERMUM L. lanigerum	Coastal Ti Tree	20	Dense	Food for coastal sandy areas; transplants well.
MYOPORUM M. insulare	Boobyalla	12-20	Dense; wide spread	Fast grower; grows from cuttings.
MACLURA M. aurantiacum	Osage Orange	20-25	Tall; bushy top	Good for interior; hardy; stands clipping and topping.
TAMARIX T. aphylla	Flowering Cypress	16-20	Dense	Fast grower inland; grows from cuttings.
MELALEUCA M. stypheloides	Queensland Paper Bark	20	Bushy top	Poor sandy country.
STERCULIA S. diversifolia	Currajong	20-25	Heavy top	One of the best for interior; stands lopping for stock feed in time of drought.
SCHINUS S. molle	Pepper Tree	20-25	Wide spread; dense	Warm drier districts.
PLATANUS P. orientalis	The Plane	40-60	Wide spread	Wonderful shade tree; likes the warmer areas.

BLOSSOM TREES

Botanical Name	Popular Name	Height Ft.	Habit	Foliage	Flowers, etc.
PRUNUS					
<i>bliricaea</i>	Double Pink Plum	10-12	Half Spread	Purple	Flower in July, Aug.
<i>mume</i>	Double Flower Apricot	10-12	Spread	Green	Flowers red, pink, white
<i>pissardii</i>	Persian Cherry Plum	12-16	Spread	Purple	June, July, Aug., Sept.
<i>Vesuvius</i>		12-16	Wide Spread	Purple	Flowers white
<i>persica</i>	Double Peach	10-16	Wide Spread	Green	Red, pink, white; Sept.
<i>serrulata</i>	Double Cherry	16-20	Upright	Green	Pink; Sept., Oct.
<i>hizakura</i>	Double Cherry	16-20	Upright	Bronze green	Red, pink; Sept., Oct.
Mount Fuji	Double Cherry	12-15	Wide Spread	Green	White; Sept., Oct.
PYRUS					
<i>malus spectabilis</i>	Crab Apple	16-20	Spread	Green	Pink; Sept., Oct.
<i>eleyi</i>	Crab Apple	12-16	Spread	Purple	Red; Sept., Oct.
<i>purpurea</i>	Crab Apple	10-12	Wide Spread	Purple	Red
<i>ionensis</i>	Crab Apple	16-20	Spread	Green	Pink, sweet
<i>lemoineii</i>	Crab Apple	12-16	Half Spread	Purple	Wine-red

EVERGREEN TREES

Botanical Name	Popular Name	Height Ft.	Habit	Foliage and Use
ACACIA				
<i>A. elata</i>	Cedar Wattle	25-30	Spread	Handsome tree; does well in poor soil; flowers mid-summer.
<i>A. normalis</i>	Queen Wattle	12-16	Half Spread	Most beautiful; all districts; flowers Sept.
ANGOPHORA				
<i>A. lanceolata</i>	Gum Myrtle	30-40	Wide Spread	Handsome tree; young foliage tipped red; very hardy; all districts.
BANKSIA				
<i>B. integrifolia</i>	Tall Vict. Honeysuckle	16-20	Upright	Coastal sandy areas. Distinct foliage.
CALODENDRON				
<i>C. capense</i>	Cape Chestnut	16-20	Wide Spread	Very hardy; flowers pink in mid-summer; conspicuous.

EVERGREEN TREES

Botanical Name	Popular Name	Height Ft.	Habit	Foliage and Use
CINNAMOMUM C. camphora	Camphor Tree	20-25	Wide Spread	A beautiful tree of shrubby habit; brittle wood.
EUCALYPTUS E. calophylla rosea E. ficifolia	W.A. Pink Gum W.A. Scarlet Gum	30-40 15-16	Spread Spread	Bright pink blossom; conspicuous; all districts. Brilliant in flower; colours vary; all districts except wet.
E. citriodora	Lemon Scented Gum	30-40	Slender	Scented foliage; frost-tender; snow white trunk.
EUGENIA E. ventenati	Queensland Myrtle	25-30	Wide Spread; dense	Requires good soil and rainfall; often of pendulous habit.
GREVILLEA G. robusta	Silky Oak	25-40	Spread	Flowers orange, summer; conspicuous; frost-tender.
JACARANDA J. mimosaeifolia		25-30	Half Spread	Flowers blue, summer; conspicuous; frost-tender.
LEUCODENDRON L. argentum	S. African Silver Tree	12-16	Upright	Silvery foliage; cooler districts; well-drained soil.
MAGNOLIA M. grandiflora	Tree Magnolia	12-20	Spread	Large leaves; immense white flowers, summer; good soil and rainfall.
MEIALEUCA M. stypheloides	Queensland Paper Bark	12-20	Dense	Poor soil; all districts except frost and wet.
SCHINUS S. melle	Pepper Tree	16-20	Wide Spread; dense	Attractive many purposes; hot-dry areas; any soil.
STERCULIA S. acerifolia S. diversifolia	Queensland Flame Tree Currajong	20-25 20-30	Spread Spread	Most brilliant in flower during summer; warm districts, rainfall. Good any purpose tree; warm dry climate; stand lopping.
STENOCAARPUS S. Cunninghamii	Wheel Tree	16-20	Slender	Brilliant red flowers; warm districts.

CONFERS

Botanical Name	Popular Name	Height Ft.	Habit	Climate	Foliage and Use
ABIES					
<i>A. excelsa</i>	Silver Fir	50-60.	Spread; tapering	Cool	Green, specimen.
<i>A. nordmanniana</i>	Caucasian Fir	40-50	Half spread; tapering	Cool	Blue-green, specimen.
AGATHIS					
<i>A. australis</i>	New Zealand Kauri	30-50	Spread	Cool	Green, specimen; slow-growing.
<i>A. robusta</i>	Queensland Kauri	40-60	Upright	Average	Specimen.
ARAUCARIA					
<i>A. bidwilli</i>	Bunya Bunya	40-60	Wide spread	Average	Green, specimen.
<i>A. excelsa</i>	Norfolk Island Pine	60-70	Spread	Average	Green, specimen.
<i>A. Cunninghamii</i>	Queensland Hoop Pine	50-60	Spread	Average	Green, specimen; timber.
BIOTA					
<i>A. nana aurea</i>		2-3	Round	Average	Gold; a gem for rock gardens.
CUPRESSUS					
<i>C. arizonica</i>	Arizona Cypress	16-20	Half spread	Average	Green-blue; very hardy.
<i>C. brunniana aurea</i>	Upright Golden Cypress	16-20	Upright	Average	Gold, specimen.
<i>C. horizontalis aurea</i>	Lambert Cypress	60-80	Wide spread	Average	Green; hedge breakwind.
<i>C. horizontalis aurea</i>	Golden Lambert	40-50	Spread	Average	Gold, specimen.
<i>C. horizontalis Hodginsii</i>	Variegated Lambert Cypress	30-40	Spread	Average	Silver and green, specimen.
<i>C. lusitanica</i>	Cedar of Goa	20-30	Pyramidal	Average	Silvery green, specimen.
<i>C. Lawsoniana</i>	Lawson Cypress	20-30	Pyramidal	Average; moist soil	Green, specimen.
<i>C. L. allumii</i>		6-8	Upright; narrow	Average; moist soil	Blue-green.
<i>C. L. darleyensis</i>		6-8	Upright; pendulous	Average; moist soil	Gold.
<i>C. L. aurea</i>		12-16	Pyramidal	Average; moist soil	Gold; choice.
<i>C. L. erecta aurea</i>	Golden Lawson	3-4	Upright	Average; moist soil	Gold; rock garden.
<i>C. L. Fletcherii</i>		4-5	Upright	Average; moist soil	Specimen; blue foliage.
<i>C. L. Olbrickii</i>		4-5	Globose	Average; moist soil	Pale green, specimen.
<i>C. L. triomphe De Boskoop</i>		10-12	Erect; pendulous	Average; moist soil	Blue-green, specimen.
<i>C. stricta</i>	Roman Cypress	16-20	Columnar	Average	Green, specimen.
<i>C. torulosa</i>	Nepal Cypress	15-20		Average	Silver green, specimen; hedge.
CEDRUS					
<i>C. atlantica</i>	Atlantic Cedar	40-50	Wide spread	Average	Green, specimen.
<i>C. atlantica glauca</i>	Blue Cedar	25-40	Spread	Average	Blue, choice specimen.
<i>C. deodara</i>	Indian Cedar	60-70	Spread	Average	Silvery green, specimen.
<i>C. deodara</i>	Golden Deodar	10-12	Half spread	Average	Golden, choice specimen.
CRYPTOMERIA					
<i>C. elegans</i>	Japan Cedar	10-16	Bushy	Average	Green in summer; bronze winter.

CONIFERS

Botanical Name	Popular Name	Height Ft.	Habit	Climate	Foliage and Use
JUNIPERUS J. africana J. prostrata aurea J. hibernica	African Juniper Prostrate Juniper Irish Juniper	3-4 2 ft. 10-12	Upright; dense Sprawly; dense Columnar; dense	Average Average Average	Blue-green, specimen. Gold, specimen; rock garden. Blue-green, specimen.
DACRYDIUM D. cupressinum D. Frankii	New Zealand Rimu Huon Pine	20-25 25-30	Open; drooping branches Open; drooping	Cool, moist only Cool, moist only	Beautiful tree; bronze green. Bronze green, specimen.
LARIX L. europaea	The Larch	40-50	Erect; tapering	Cool, moist only	Specimen; deciduous.
LIBROCEDRUS L. doniana	New Zealand Thuja	12-16	Columnar	Cool, moist	Light green; attractive specimen.
PICEA PUNGENS P. P. glauca P. P. kosteriana	Colorado Spruce Blue Spruce	25-30 20-25	Pyramidal Pyramidal	Average moist Average moist	Silvery blue-green. Intense blue; a perfect gem.
PINUS P. canariensis P. excelsa P. halepensis P. insignis P. pinaster P. pinea P. ponderosa	Canary Island Pine Indian Pine Aleppo Pine Pine Tree Mediterranean Pine Stone Pine	40-50 40-50 40-50 50-60 30-40 30-40 40-50	Spread Pyramidal; dense Spread Spread Tapering Flat top Flat top Spread; dense	Average Cool, moist Average Average Average Average Average	Light green; hardy, handsome tree. Green; handsome drooping cones. Seaside breakwind. Deep green; shelter. Light green; seaside planting. Seaside; edible nuts. Deep green; a noble tree.
PODOCARPUS P. totara P. spinulosus	New Zealand Totara Illawarra Pine	20-30 20-30	Spread; dense Dense	Average Average	Dark green, specimen.
RETINOSPORA OBTUSA R. O. cripplii R. O. nana R. O. tetragona aurea R. ericoides R. squarrosa		6-9 3-4 3-4 4-6 6-8	Pyramidal; dense Dense; dwarf Dense; dwarf Dense; globular Low; pyramidal	Average, moist Average Average Average Average	Bright gold, specimen. Deep green; rock garden. Golden, moss-like; very slow. Bronze in winter. Grey, blue-green.
THUJA OCCIDENTALIS T. O. ericoides T. O. pyramidalis T. O. rheingold T. plicata T. plicata zebrina		3-4 10-12 4-5 30-40 6-8	Pyramid; bushy Columnar; dense Globular; dense Tapering; dense Densely tapering	Average Average Average Average Average	Bronze in winter. Deep green; a beautiful specimen. Gold in summer, bronze in winter. Specimen, hedge; fast growing. Green variegated with gold.

CONIFERS

Botanical Name	Popular Name	Height Ft.	Habit	Climate	Foliage and Use
THUJOPSIS T. dolobrata		10-12	Pyramid	Average, moist	Green and cream specimen.
TAXODIUM T. distichum	Bald Cypress	40-50	Ascending; pyramid	Cool, moist	Deep green; a deciduous tree.
TAXUS T. baccata T. hibernica fastigata T. hibernica aurea	English Yew Irish Yew Golden Irish Yew	10-12 6-8 5-6	Pyramid; dense Columnar; dense Columnar; dense	Cool, moist Moist Moist	Dark green, specimen; hedge. Light green, specimen. Golden, specimen.
SEQUOIA S. gigantea S. sempervirens	Mammoth Pine Redwood	60-80 50-70	Ascending; pyramid Spreading; pyramid	Cool, moist Cool, moist	Light green; grows rapidly. Dark green; very handsome.
CALITRIS C. robusta C. cupressiformis	Murray Pine Mallee Pine	20-30 16-20	Pyramid Columnar	Sandy, warm Sandy, warm	Breakwind, shade. Breakwind, specimen.

.. SHRUBS ..

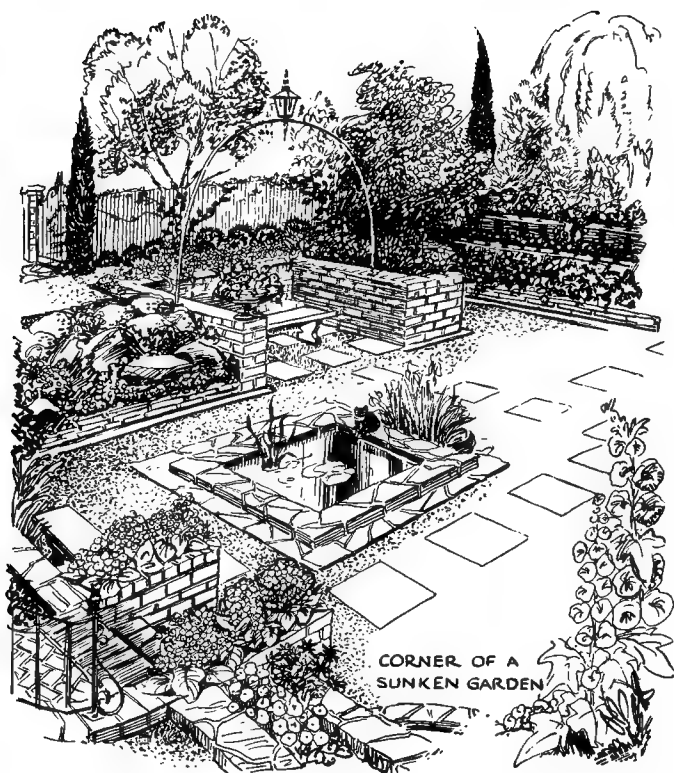
(See *Pruning Section for Pruning Shrubs, and Index for plants not listed in tables*)

It is not for us to lay down the law as to when a shrub should be called a tree. We've kept an arbitrary 10 ft. as the maximum reaching height of a shrub. Shrubs for the most part have several woody stems and hold their growth year after year.

For a more complete listing of shrubs see our classified catalogue-index at the back of this book. Abbreviation E. signifies evergreen; D means deciduous, putting out fresh foliage in the spring yet letting the winter's sun filter to plants beneath. They don't make good break-

winds or hedges, and don't camouflage rickety fences. For such you will need needle-leaved evergreens or the decorative broad-leaf kinds. They are worth their high cost because a 20/- shrub lasting 20 years costs but 1d. a month.

Read our propagation, planting and pruning parts. It will cost you another pound if you don't plant it right. See Zones on page 6. Be a loyal Australian and put in a native or two. Refer to the next chapter.



Rare and Uncommon Shrubs . . .

by D. J. W. CHANDLER

THE term "rare shrubs" is not easy to define. Many shrubs which have returned to favour were known long ago and lost through neglect and lack of popular demand. Gradually the new generation of gardeners is discovering their possibilities.

An instance of this is *Deutzia longifolia*, var. *Veitchii*. In cultivation some years ago, it is now rarely seen. A beautiful semi-shade-loving plant, in the spring it has large, soft, lilac-pink flowers, resembling *kalmia*. It grows to a height of three to four feet.

Another *Deutzia* becoming known in Victoria *D. kalmiaeflora*, a shrub of bushy habit, very free flowering, with large lilac pink flowers. Another hybrid, seldom seen, is *D. elegantissima*. Growing to a height

of about 4 ft., it has long arching branches and rose pink fragrant flowers.

All the *Deutzias* mentioned are easy to grow and good garden subjects.

Another old-timer that has found its way

RARE SHRUBS

back is the *Davidia*, or Dove Tree. This most interesting and beautiful tree is a glorious sight in November, when every branch is laden with white bracts borne in pairs. These are sometimes 8 in. in length and 4 in. wide. It needs coolness around the roots.

In Rowans, a variety beginning to find favour is *Pyrus hupehensis*, which does well in Melbourne and suburbs. The foliage takes on beautiful autumn tints and the fruits are pink-shaded white.

Abelia is well known, but a variety not often seen is *A. floribunda*. The rosy red, pendulous flowers, 1½ to 2 in. long, appear in summer, and are carried on long arching branches. In bloom it is a truly handsome shrub.

Cornus Nuttallii, known overseas for some time, is new to this country. It is an outstanding deciduous tree carrying masses of bracts, creamy white flushed with pink, followed by fruits resembling strawberries from long thin stems. The autumn foliage is brilliant, colouring yellow and scarlet.

The *Cydonia*, or Japanese flowering quince, is a popular shrub, but less familiar are the double varieties. Unnamed, they come in double red, double scarlet, double rose pink, and double white.

A *Magnolia* bound to become popular as stocks become available is *M. Mollicomata*. A hardy magnolia, it is somewhat like *M. Campbelli* in colour—pink—but where *M. Campbelli* does not flower until the tree is 15 to 20 years old, this variety will flower on quite young plants. The flowers are cup-shaped, 6 to 7 in. wide.

A wonderful little dwarf Russian Almond named *Prunus Nana* is well worth growing. It grows to a height of about 4 ft. and in the spring is covered with miniature pink peach-like flowers.

A newcomer is a weeping willow found in the deserts of China—*Salix matsudana*, var. *pendula*. A much prettier tree than the ordinary weeping willow, the leaves are glaucous underneath, and it will grow under dry conditions.

An Azalea known for some time as *R. Schlippenbachii*. Probably the most beautiful of all the species, the flowers are flattish and often over 3 in. across. It grows in a compact bush and the foliage is ornamental. Flowers are a beautiful shell pink.

An evergreen shrub with foliage like that of a holly is *Desfontainia spinosa*. It

has large red and yellow tubular flowers about 1½ in. long, and quite young shrubs will flower. It requires similar conditions to rhododendrons.

A companion shrubs rarely seen is *Tricuspidaria Lancelolata* (*Crinodendron Hookerianum*). A Chilean evergreen shrub, it is regarded as one of the "gems of the garden." One English grower has likened the flowers to "growing crimson lanterns." These appear thickly in November. It likes partial shade and lime-free soil.

A shrub winning the gold medal in England recently for the best new shrub was *Viburnum carlcephalum*. The best way to describe this is to say it is a glorified *V. Carlesii*, with the same colour and glorious perfume. The flower heads are 4 to 5 in. across, and it is easy to grow.

Another *Viburnum*, similar to *V. Burkwoodii*, but again an improvement, is *V. Burkwoodii*, var. *Park Farm* hybrid, of a more spreading habit; it has larger flower trusses.

An old variety, but one which has slipped out of cultivation, is *V. fragrans*, var. *candidissimum*. It produces in the winter sweetly-scented white flowers, resembling a white daphne.

Another winter-flowering shrub worth growing is the fragrant *Corylopsis*. Related to the witch hazel, it bears cup-shaped, primrose yellow fragrant flowers, closely packed on pendulous branches. The anthers are purplish-red and the leaves are heart-shaped and very ornamental. There are two varieties known in Australia, but *C. Griffithii* is the better.

Hamamelis mollis (Chinese Witch Hazel) is known to a few, but it deserves to be in every garden. The flowers, appearing in winter, are fragrant, rich golden yellow in colour, with a purplish-brown centre. The foliage is very ornamental, colouring beautifully in the autumn.

Another shrub for lime-free soil is still unnamed, and is known only as *Pieris Forrestii*, var. *brilliant*. The young leaves are a vivid red, gradually turning yellow, and then green. It is undoubtedly the best of the *Andromedas*. It has large heads of fragrant white flowers, at least twice as large as *P. Japonica*, the well-known Japanese pearl flower. The shrub grows to about 6 ft. and needs the same treatment as rhododendrons.

Rhododendrons . . .

. . . NOW TAKE PRIDE OF PLACE

by D. J. W. CHANDLER

IN recent years rhododendrons have become popular, and garden-lovers are beginning to enlarge their collections. One of the oldest and best-known species is *Ponidamm Purple*, a native of Europe, which grows readily in our cooler gardens. In favourable conditions it seeds freely, and young plants in plenty come up near the parent bush.

Old favourites include *Cynthia*, rose pink with a perfectly shaped truss; *Broughtonii*, deep rose pink with brown spots and a very large truss; *Nobleanum*, red, small truss, but very early; *Christmas Cheer*, extra early, soft pink. There are many others which could be included in this list, and some of these are to be seen at spring flower shows.

Some later crosses from these hybrids are *Mrs. Stirling*, blush lilac pink, one of the best garden varieties; *Alice*, rich pink, with perfect truss.

With the introduction of *R. Griffithiana*, *R. Aucklandi*, and others from China, a new race of rhododendrons appeared. By crossing these species with the existing hybrids a new strain was developed which are not quite as easy to grow as the original hybrids.

The species *Griffithiana* and *Aucklandi* grow at a very high altitude of from 10,000 ft. to 15,000 ft. They are sheltered by deciduous trees, from which each year they receive a mulch of fallen leaves. The summer is extremely wet, and autumn and winter are dry and cold. This shows the vast difference in their natural surroundings from those to which they are subject in this country. The hybrids from this species need shade, but at the same time, if they have too much shade, they do not flower.

Hybrids raised from *R. Griffithiana* x *F. Fortunei* (another high altitude species) include some of the most beautiful rhododendrons in commerce. Outstanding in this group are *Loderi King George*, *L. Pink Diamond*, *L. Patience*, and *L. White Diamond*. They all have large wax-like flowers, some individual flowers measuring 6 in.

across, and the trusses are immense. It is recorded that some have measured up to 30 in. around. Unfortunately, they are difficult to grow except in hilly, moist climates, as they resent a hot, dry summer, and cannot tolerate too much sun. This magnificent group was raised in England by the late Sir William Loder. While they are not recommended for the beginner, experienced growers with a knowledge of rhododendron-growing would have a reasonable chance of success.

A recently-introduced species which has given good results is *R. Griersonianum*. Although it grows at a very high altitude, it is doing remarkably well under garden conditions. The foliage is liable to burn under garden conditions if given too much sun, but it seems to be quite at home if it is given a little shade by shrubs or small trees. The funnel-shaped flowers are a rich soft carmine, almost geranium colour, with four to five flowers on a truss. It flowers a little later than most species. This is being used for new crosses, but so far they are sun-tender.

In cultivating rhododendrons, their natural surroundings must be remembered. They are nearly always found growing on slopes at the edge of a woodland or amongst deciduous shrubs or trees. The root system does not extend far, and is a mass of fibrous roots, which are near the surface. The reason for this is that they feed on the leaf mould from the fallen foliage, either washed down the slope or blown around the plants. Each season the fallen leaves give the necessary acidity to the soil. If the surrounding leaf mould is not renewed each year the soil has a tendency to become alkali.

RHODODENDRONS

In Mrs. Harold Brookes' garden at Woodend (Vic.) is the finest collection of rhododendrons in Australia. Here they are mostly grown amongst deciduous trees, and they are heavily dressed each year with humus. Each type is grown so as to get the amount of light it requires.

Care must be taken to avoid liming the soil where rhododendrons are grown. All rhododendrons and azaleas are lime-haters. A liberal supply of water in the summer is essential.

In selecting a position in which to plant rhododendrons, two important things must be considered. They must have sufficient room to develop, as quite small plants will, in a short time, grow into bushes 5 to 6 ft. or more in height and as many feet through. Secondly, they must be in a position where they will receive partial shade in the hottest part of the day. A southerly or easterly aspect is best, and planting near evergreens should be avoided where possible. Evergreens give too much shade during the late autumn and winter, and it is at this period that the plants need as much air and light as possible so as to ripen the current year's growth. This will enable the plant to develop flower buds for the spring blossoming. If the plants are given too much shade the growths will be drawn and weak and will seldom develop flower buds.

Rhododendrons can be grown in most gardens provided they are planted in a position which is sheltered from the hot drying winds in summer. Natural shelters for rhododendrons are deciduous trees, and a happy arrangement would be to grow them near flowering cherries. The best varieties are those with twiggy growth, which allows a certain amount of light to filter through at all times. *Prunus subhirtella*, *P. conradinae* and *P. Uicisa* can be recommended for this purpose. The floribunda types of flowering apples are also suitable for growing rhododendrons, and magnolias and other deciduous trees can be used equally well, depending on the garden lay-out.

A liberal supply of moisture during the summer months and early autumn is necessary both at the roots and sometimes by overhead spraying. On no account should they be allowed to become dry at the roots during this period, as the plant is liable to collapse and not recover.

Any soil that is free from lime seems to suit them, provided an annual top-dressing of leaf mould is given. An occasional dressing of tannin bark is beneficial.

When buying rhododendrons, medium-sized plants are best. These establish themselves quickly, and come into flower the first season. Large plants will move, but they receive a check the first season after transplanting and are not at their best until the following year.

The beginner is advised to select varieties such as the White Pearl, which make their growth early and mature early.

Pests

Pests affecting rhododendrons are few in this country. The most harmful are the black thrip, usually due to dry conditions. They suck the sap from the leaves, leaving them with a silvery appearance, with small black specks underneath. Spraying them with 1 oz. nicotine sulphate, 2½ oz. soft soap, and four to five gallons of water is recommended by the Department of Agriculture. Spraying should be repeated at regular intervals so as to clear up any insects missed in the previous spraying.

Red spider is sometimes troublesome. The best method of control is to keep the plants sprayed with water during the summer and sprayed with any nicotine compound available from florists.

Mollis Azaleas

The Mollis group, although frequently referred to as azaleas, are actually rhododendrons. They are deciduous, and do not grow into large shrubs. They originated from crossing *R. Molle* with *R. Japonicum*, *luteum*, and others. The colours range through white, orange, apricot yellow, scarlet and red. The cultivation is similar to the general type of rhododendrons—a liberal supply of leaf mould worked right into the soil and plenty of water immediately the flowers fade, so as to encourage a new growth. This type stands more sun. The foliage turns brilliant autumn tints.

Some of the best varieties are: Anthony Koster, rich yellow; Koster's Red, orange red; Doctor Richtenbach, salmon red, shaded; Hugo Koster, salmon red; J. T. Seidel, deep salmon, and Koster's Yellow.

Then there are the Ghent varieties, which are similar to the Mollis in habit and growth, but with more spidery flowers. They are generally sweetly scented.

In recent years a new race of Mollis *x* Sinense has made its appearance. These varieties are called Kersberger's strain. They have larger flowers and more brilliant colours, and are offered by nurserymen under the name of Kersberger's seedlings.

DECIDUOUS SHRUBS — Flowering

Botanical Name	Height Ft.	Habit	Flower	Remarks
BOUVARDIA many varieties	3-4	Very spare	Many shades; red pink, white	Delightful summer flowers.
CALYCANTHUS <i>C. praecox</i>	6-8	Upright	Yellow	Winter; fragrant.
CERCIS <i>C. siliquastrum</i>	8-10	Tree-like	Rosy purple	Spring.
CHIMONANTHUS <i>C. Florida</i>	8-10	Upright	Red-brown	Late spring; fragrant.
CYDONIA <i>C. japonica</i> <i>C. falconnet charlet</i> <i>C. winter cheer</i>	3-5 3-5 3-5	Dense Dense Dense	Red Salmon pink Bright red	Winter; indispensable for when flowers are scarce. Winter; indispensable for when flowers are scarce. Winter; indispensable for when flowers are scarce.
DEUTZIA <i>D. gracilis</i> <i>D. crenata flore plena</i>	2-3 5-6	Twiggy Upright	White White	October; dense flowering. October; double flowers.
ENKIANTHUS <i>E. campanulata</i>	3-4	Bushy	Reddish	Spring.
HYDRANGEA <i>H. paniculata</i> many varieties	4-5 3-5	Bushy Bushy	White Many colours	Summer; best in cool districts. Summer.
INDIGOFERA <i>I. decora</i>	2-3	Bushy	Pink	Spring.
LABURNUM <i>L. vulgare</i>	10-12	Spare	Yellow	Spring; the English laburnum.
LAGERSTROEMIA <i>L. indica</i>	8-10	Half spread	Red, pink, white	Late summer; warm districts.
LANTANA <i>L. sellowiana</i> many varieties	2-3 2-5	Trailing Bushy	Light purple Red, orange, yellow	Summer; useful to cover fences. Summer; hardy; very bright.

DESCIDUOUS SHRUBS

Botanical Name	Height Ft.	Habii	Flower	Remarks
MAGNOLIA				
M. conspicua	6-8	Upright	White	Early; cup-shaped; spring flowering.
M. kobus	12-16	Tree-like	White	Star-like; very free; spring flowering.
M. obovata purpurea	6-8	Wide bush	Purple	Free-flowering; late spring.
M. lennei	10-12	Upright	Rosy purple	Late spring flowering.
M. soulangeana	10-12	Upright	Pink	Most popular; spring flowering.
M. stellata	6-8	Upright	Snow white	Fragrant; spring flowering.
KOLKWIITZIA				
K. amabilis	5-6	Bushy	Pink	Spring; the Chinese Beauty Bush.
PHILADELPHUS				
P. Burkwoodii	4-6	Upright	Pinky white	Spring; fragrant.
P. mexicanus	4-5	Bushy	White	Spring; very fragrant.
P. virginial	4-5	Upright	White	Spring; semi-double; fragrant.
PUNICA				
P. granatum flore plena	6-8	Tree-like	Scarlet	Spring; double flowers.
SPIRAEA				
S. reevesiana flore plena	4-5	Spread	White	Spring; Italian May.
S. gracilis	2-3	Bushy	White	Spring; narrow leaves.
SYRINGA				
S. dilatata	5-6	Bushy	Pale lilac	August; fragrant.
S. Wilsonii	5-6	Bushy	Pink	Late spring.
S. persica	4-5	Bushy	Lavender	Spring; the Persian Lilac.
many hybrids	4-6	Upright	White, blue, purple	Spring; lilacs, double and single.
TAMARIX				
T. tetrandra	6-8	Spare	Rosy pink	Spring.
TECOMA				
T. capense	6-8	Spare	Orange, scarlet	Summer.
T. Smithii	6-8	Spread	Yellow, orange	Summer.
VIBURNUM				
V. carlesii	4-6	Bushy	Rosy white	Early spring; fragrant.
V. opulus sterile	6-8	Bushy	White	Spring; Snowball.
WEIGELIA				
W. amabilis	4-6	Upright	Pink	Spring.
W. candida	4-6	Upright	White	Spring.
W. Eva Rathke	4-6	Upright; arching	Crimson	Spring.

Evergreen Shrubs . . .

Before planting the ground should be drained, the drains well into the clay. If agricultural pipes are used these must be covered with 4-6 in. of clinker ash. In country districts where the material is plentiful a good drain can be made by going a little deeper and laying in 5-6 ft. lengths of saplings (do not remove the bark). Overlay these with ti-tree brush, gorse or any similar material well tramped in. These drains will last for many years, indefinitely, and are as serviceable as they are cheap.

Cultivation

Dig the ground a full space deep. If at all poor, dig in all the stuff possible that will make humus. After planting, sow peas, tick-beans or the like, and dig in when in flower.

Planting is an art wherein overcrowding has no part. Each individual should have space sufficient to show and prove itself. Almost all flowering shrubs are things of sunlight. Though a few, such as hydrangeas and fuchsias, enjoy partial shade, none will flower in deep shade. Many revel in the heat of midday and afternoon sun, while others like the rhododendron, azalea and camellia, are happiest with morning sunshine only.

Whilst trees must form the salient points in any garden, shrubs provide the inner setting, where a greater variety of foliage and flower provides a continuous feast of interest and beauty.

The placing of shrubs at all times demands much care and consideration. Height and breadth must be learned and allowed for; colour and variation of foliage also, that contrast and harmony may dignify the whole planting. Dense evergreens should be used as a foil to deciduous flowering subjects — blossom trees and certain shrubs.

Planting

The planting season of deciduous subjects with roots bare of soil is, of course, limited to the time of their dormant condition. With plants "in ball" the time may be extended a week or two either way, while all grown in pots or other containers may be transferred to open ground almost throughout the year. Really the best time for planting evergreens is with the first autumn showers, while there is still much warmth in the soil; for then, though the plants will make little if any growth above ground, they will at once make new roots. This enables them to be established before the chill of winter sets in, and they start off at once with the first breath of the following spring.

The directions given for planting trees are generally applicable to shrubs. It is as well to determine beforehand the exact spot for any tree or shrub, and drive in a stake to which is attached the name of the plant. They can then upon arrival be transferred without confusion each to its assigned position.

In good soils no manuring is immediately necessary, though a little is always helpful. No forcing manure, but a handful of what is known as market garden manure mixed with the top soil will be of great assistance in all types of poorer soil. A mulching of animal manure and straw during the growing season is the best of all.



Hibiscus Agnes Galt



Ruella Macrantha

EVERGREEN SHRUBS — Flowering

Botanical Name	Height Ft.	Habit	Flower	Remarks
ABELIA A. rupestris A. schumannii	3-4 3-4	Bushy Bushy	Pink Rose pink	In bloom all summer; sometimes used for hedge. In bloom all summer; sometimes used for hedge.
ADENANDRA A. uniflora	3-4	Bushy	White	Sweet-scented; late spring.
ARBUTUS A. unedo	12-16	Spread	White	Large berries.
BERBERIS B. Darwinii B. Sargentii	4-6 6-7	Upright Upright	Orange Yellow	Spring; good shrub. Spring; black berries.
BUDDLEIA B. globosa B. veitchiana	6-8 6-8	Spread Spare	Orange Lilac	Early summer. Summer: sweet-scented.
CANTUA C. dependens	5-6	Spare	Rosy red	Summer; long tubular flowers.
CASSIA C. candolleana	5-6	Spread	Yellow	Late summer: good.
CHOISYA C. ternata	4-6	Wide bush	White	Spring; good.
COTONEASTER C. pannosus C. serotina	6-9 6-10	Upright Spread	White White	Berries; arching branches. Berries red.
CAMELLIA C. reticulata many varieties	6-7 6-8	Bushy Bushy	Rose pink Red, pink, white	Spring; one of best of all. Winter, early spring.
CEANOTHUS C. Edwardsii C. divaricatus	5-6 6-9	Bushy Upright	Blue Blue	October. October; fast-growing.
CESTRUM C. elegans C. aurantiacum	6-8 6-8	Upright Upright	Red Orange	Winter; useful. Summer.

EVERGREEN SHRUBS

Botanical Name	Height Ft.	Habit	Flower	Remarks
CISTUS C. purpurea	3-4	Bushy	Purple	Summer; sunny position.
CLETHRA C. arborea	6-10	Upright	White	Midsummer.
CORNUS C. capitata	6-10	Tree-like	Cream	Large strawberry-like fruit.
CORYNOCARPUS C. laevigata	8-12	Upright		Good background shrub.
CYTISUS C. andreana	4-5	Upright	Crimson and gold	Spring; many kinds in various colours.
DAPHNE D. indica rubra	3-4	Spread	Pink	Winter; universal favourite.
DIOSMA D. alba D. pulchrum	3-5 3-5	Bushy Bushy	White Pink	Spring. Spring.
DURANTA D. Ellisii D. Plumerii	4-5 6-8	Bushy Bushy	Lavender Blue	Early summer. Summer; yellow berries.
ERICA many species	2-6	Various	Many	A collection will bloom all seasons.
ESCALONIA E. edinensis E. fretheyii E. macrantha E. C. F. Ball E. William Watson	4-5 6-8 4-5 4-6 6-7	Spread Upright Spread Bushy Compact	Rosy red Pale pink Spread Coral red Rich red Rose	Early summer; pendulous. Summer; background. October; good glossy foliage. October; one of the best. Midsummer
FELJOA F. selloviana	6-9	Spread	Crimson	Early summer; edible fruit.
FELICIA F. angustifolia	2-3	Spread	Deep lilac	October; conspicuous in flower.

EVERGREEN SHRUBS

Botanical Name	Height Ft.	Habit	Flower	Remarks
FUCHSIA many sorts	2-6	Various	Many colours	Early summer, autumn.
GARDENIA G. Florida G. thunbergia	2-3 5-6	Spread Dense	White White	Sweet-scented; warm sheltered position only. Summer; slow.
GARRY G. elliptica	6-8	Spread	Pale	Green catkins; choice.
GENISTA G. Florida G. monosperma	4-6 6-8	Bushy Spare	Yellow, gold Off white	October; sweet-scented broom. September; weeping broom.
GORDONIA G. anonala	6-8	Bushy	White	Winter; large single flower.
GREYIA G. Sutherlandii	4-6	Spare	Crimson	Summer; warm position.
HIBISCUS H. Agnes Galt H. General Cortezas	4-6 4-6	Spare Spare	Old rose Scarlet	Summer; warm position; choice. Summer; warm position; choice.
HYPERICUM H. patulum	4-6	Bushy	Yellow	Summer; blue-black berries.
LASIANDBRA L. grandiflora L. Edwardsi robusta	4-6 4-6	Bushy Spare	Violet, purple Violet, purple	Summer; huge flowers; need shelter. Summer, autumn; good.
LEONITIS L. leonurus	6-7	Upright	Orange	Summer, autumn; hardy.
MACKAYA M. bella	4-5	Bushy	Lilac	Summer; good shade shrub.
MAGNOLIA M. fuscata	6-7	Bushy	Copper	October; scented port wine.
MYRTUS M. communis	4-6	Spread	White	Early summer; black berries.
NANDINA N. domestica	4-6	Upright	White	Spring; bright red berries; shady position; cool moist soil.

EVERGREEN SHRUBS

Botanical Name	Height Ft.	Habit	Flower	Remarks
NERIUM N. punctatum N. splendens	6-7 6-8	Spread Upright	Pink Pink	Summer; good. Summer; double flowers.
UCHIA O. multiflora	3-4	Bushy	Yellow	Spring; black berries set in persistent red calyx.
PAVONIA P. coccinea	6-8	Dense	Scarlet	Summer; large foliage.
PLECTRANTHUS P. ectonil	4-5	Bushy	Deep blue	Autumn; half-shade.
PODALYRA P. grandiflora	5-6	Spread	Pink	October; attractive.
PROTEA P. cynaroides P. mellifera P. nerifolia	4-5 8-10 4-6	Trailing Upright Branching	Rose pink Creamy pink Pink, dark brown	Spring flowers, 6-8 inches. Winter; large. Spring; attractive.
PSORALEA P. pinnata	6-8	Upright	Blue	Spring; cut back after flowering.
RAPHIOLEPIS R. Indica pink	3-4	Spread	Pink	Spring; choice.
SOLANUM S. azureum	5-6	Trailing	Violet blue	Summer; warm wall or fence.
SOPHORA S. tetraptera	8-10	Upright	Yellow	September; conspicuous.
SPARTIUM S. juncaceum	6-8	Bushy	Yellow	Spring; Spanish broom; good.
SPIRAEA S. Anthony Waterer	3-4	Bushy	Crimson	Summer; good.
VERONICA V. imperialis	3-4	Bushy	Crimson	Winter.
VIBURNUM V. japonicum V. Burkwoodii	6-7 5-7	Upright Branching	Cream Pale pink	Fragrant; red berries. Fragrant; early spring; choice.

COLOURED AND AUTUMN FOLIAGE

Botanical Name	Height Ft.	Habit	Foliage	Remarks
AZALEA				
A. mollis	4-6	Upright	Yellow, bronze	Beautiful deciduous azaleas.
ACER				
A. palmatum	8-10	Tree-like	Yellow, red	Green throughout summer.
A. atro purpureum	8-10	Tree-like	Copper-red	Coloured throughout summer; deep red in autumn.
A. rubrum	5-6	Tree-like	Red	Red in summer; deep in autumn.
A. dissectum	2-3	Bushy	Red	Finely cut foliage.
CORNUS				
C. Baileyi	4-5	Upright	Red	Handsome in fruit.
C. Florida	10-12	Spare	Bronze red	Handsome in fruit.
CRATAEGUS				
C. Smithii	8-10	Upright	Yellow-red	Red haws and foliage.
BERBERIS				
B. atro purpurea	6-7	Bushy	Bronzy red	Rich reddish-purple in autumn.
B. Sargentiana	6-8	Bushy	Vivid red and yellow	Black berries.
CORYLUS				
C. avellana	6-8	Bushy	Purple-red	Coloured throughout season.
ENKIANTHUS				
E. cernuus rubens	4-6	Bushy	Copper-red	Red flowers in spring.
EUONYMUS				
E. Europea	6-8	Upright	Red	Red-pink berries.
PHOTINIA				
P. glabra rubens	4-5	Bushy	Crimson, scarlet	Evergreen; young foliage only coloured.
RHUS				
R. cotinus purpurea	4-6	Bushy	Wine purple	Coloured throughout summer.
SPIRAEA				
S. gracilis	2-4	Bushy	Red, yellow	Fine foliage; useful in floral work.
STEPHANANDRA				
S. flexosa	5-6	Arching	Coppery yellow	Need plenty of room.
VIBURNUM				
V. Americanum	6-8	Bushy	Bronze gold	Red berries.
V. lantana	5-6	Bushy	Red-gold	Bright red berries.
V. opulus	6-8	Bushy	Red-gold	Bright red berries.

BERRY SHRUBS

Botanical Name	Height Ft.	Habit	Foliage	Remarks
COTONEASTER				
C. Franchetii	5-6	Spread	Bright green	Berries orange-red
C. horizontalis	4-5	Wide spread	Small	Berries red; leaves silver and green.
C. horizontalis variegata	1 1/2-2	Spread	Small	Berries crimson; ovate.
C. Henryana	5-6	Weeping	Large oval	Berries dull red.
C. microphylla	2-3	Dwarf	Dark green; small	Berries red.
C. pannosa	7-8	Slender	Silvery green	Berries bright scarlet.
C. serotina	7-8	Bushy	Silvery green	
CRATAEGUS				
C. carrierei	8-10	Upright	Green	Berries bright red; showy.
C. crenulata	8-9	Branching	Green	Berries scarlet.
C. splendens	10-12	Tree-like	Green	Berries red; autumn foliage.
ILEX				
I. aquifolium	12-15	Upright; dense	Dark green	Berries scarlet; holly.
PYRACANTHA				
P. angustifolia	6-8	Branching	Green	Berries orange-scarlet.
P. coccinea	5-6	Half spread	Green	Berries flame red.
P. Rogersiana flava	5-6	Bushy	Green	Berries golden yellow.
P. yunnanensis	4-5	Branching	Green	Berries crimson; showy.

VARIEGATED AND FOLIAGE SHRUBS

Botanical Name	Height Ft.	Habit	Foliage	Remarks
ABUTILON				
A. aureum variegata	5-6	Spread	Gold	Need severe cutting to keep within bounds. Shelter from cold winds.
A. Sawitzii	2-3	Spare	Silver	
AUCUBA				
A. japonica aurea	4-6	Bushy	Gold and green	Handsome; burns in hot sunshine.
ARALIA				
A. Sieboldii	3-4	Bushy	Green	Large palmate leaves; shade.

VARIEGATED AND FOLIAGE SHRUBS

Botanical Name	Height Ft.	Habit	Foliage	Remarks
BUXUS				
B. sempervirens variegata	1-1½	Dense	Silver	Hardy; useful on rockeries.
COPROSMA				
C. bauerii variegata	5-6	Bushy	Pale gold	Hardy.
ELAEAGNUS				
E. aurea	5-6	Dense	Gold	Very hardy; hedge.
EUONYMUS				
E. aurea variegata	6-8	Dense	Gold and green	Very hardy; in several forms.
HOHERIA				
H. populnea	6-10	Bushy	Green, gold	Open, sunny position.
HYPERICUM				
H. moserianum	1-1½	Compact	Green, pink, cream	Colours best in poor soil.
ILEX				
I. aquifolium gold variegated	6-8	Upright	Green, gold	Margined with gold; red berries.
I. aquifolium silver	8-10	Upright	Green, silver	Margined silver; red berries.
I. aquifolium hedgehog	6-8	Upright	Gold	Leaves spined; handsome.
LEUCADENDRON				
L. argenteum	12-15	Upright	Silver	African silver tree; cool drained soil.
NERIUM				
N. splendens variegata	6-8	Spare	Green, gold striped	Conspicuous; flowers pink.
OSMANTHUS				
O. aquifolium argentea	2-3	Dense	Silver	A gem for the rockery.
PITTOSPORUM				
P. nigrescens purpurea	5-6	Bushy	Purple	Small foliage; distinct.
P. grassifolium variegata	6-7	Upright	Silver	Popular shrubs; very hardy.
P. eugenoides variegata	8-10	Bushy	Silver	Popular shrubs; very hardy.
LIGUSTRUM				
L. lucidum aureo-marginatum	10-12.	Bushy	Gold	Rapid grower; hardy.
L. aureum elegantissimum	4-6	Dense	Gold	The hedge privet.
RHAMNUS				
R. alaternus variegata	6-7	Spread; dense	Green and cream	Hardy; sea coast; hedge.

VARIEGATED AND FOLIAGE SHRUBS

Botanical Name	Height Ft.	Habit	Foliage	Remarks
SAMBULUS <i>S. nigra aurea</i>	6-8	Bushy	Gold	The Golden Elder; deciduous.
VERONICA <i>V. Andersonii variegata</i> <i>V. imperialis variegata</i> <i>V. salicifolia variegata</i>	2-3 2-3 3-4	Bushy; erect Bushy; round Bushy	Milk-white, green Cream and green Cream and green	Broad leaf; blue flowers. Broad leaf; crimson flowers. Narrow leaf; pink flowers.
WEIGELIA <i>W. argentea variegata</i>	4-5	Bushy	Silver	Deciduous; pink flowers; choice.

SHRUBS FOR COOL DISTRICTS — Lime-free Soils

Botanical Name	Height Ft.	Habit	Flower	Remarks
AZALEA <i>A. indica</i> <i>A. kurume</i> <i>A. mollis</i> <i>A. Ghent</i>	2-4 2-3 3-4 3-5	Bushy; evergreen Bushy; evergreen Upright; deciduous Upright; deciduous	Various Various Various Various	Many varieties; double and single, self and parti-coloured. Small flowers; all self-coloured. Medium; red, orange, yellow, pastel shades. Flowers trumpet and bell-shaped; self colours.
ANDROMEDA <i>A. catesbeia</i> <i>A. japonica</i> <i>A. paniculata</i>	3-4 4-5 4-5	Bushy; deciduous Upright; evergreen Bushy; deciduous	White White Cream	Spring; handsome foliage colours in autumn. Spring; flowers in pendulous racemes. Fragrant; foliage brilliant in autumn.
ENKIANTHUS <i>E. campanulatus</i>	3-4	Bushy; deciduous	Greenish	Brilliant autumn foliage.
RHODODENDRON <i>R. Himalayan</i>	2-10 4-6	Bushy; evergreen Bushy	Many White	Late spring; numerous and increasing numbers to select from. Large trumpet and bell-shaped flowers, highly scented, of which the best is <i>R. fragrantissima</i> .

Natural Fences and Breakwinds . . .

HEDGES

Hedges are for screen or breakwind, often combining both purposes. They may be formal, requiring constant clipping, or informal; allowed to grow naturally except for an occasional cut-in to preserve the line. The Cypress, Privet or other evergreen is

used for the formal hedge, whilst a carefully selected variety of shrubs, deciduous as well as evergreen, make up pleasingly informal; or if there be preference for a single species, something like the Lorraine Lee rose or the dwarf Photinia is excellent. But, no matter of what the hedge is, attention to clipping or pruning is necessary at times. If allowed to overgrow, most ever-

greens will suffer a hard cut-back, but not so the Cypress, the clipping of which must be regular and never further back than green wood — therefore urgent, and frequently inconvenient.

As regards cutting and clipping, large foliage subjects really should never be clipped with shears, but cut back into shape with secateurs.

Botanical Name	Popular Name	Height Ft.	Habit	Remarks
ABELIA A. rupestris		3	Bushy	White flowers; summer.
CEANOTHUS C. Edwardsii		3-5	Bushy	Blue flowers; October.
CERATONIA C. silqua	Carob Bean	8-10	Dense	Set hedge or windbreak; excellent for warm areas.
CINNAMOMUM C. camphora	Camphor Laurel	8-10	Wide spread	Suitable for big hedges.
CHOISYA C. ternata	Mexican Mock Orange	4-5	Bushy	White flowers; October, November.
CRATAEGUS C. oxyantha	The Hawthorn	6-8	Spare	An old favourite; thorny.
CUPRESSUS C. horizontalis C. torulosa	Lambert Cypress Nepal Cypress	6-12 6-12	Dense Tapering	Tall, close hedge. Good as an informal hedge.
CYDONIA C. japonica	Winter Cheer	3	Dense, spiny	Flowers red; winter, spring.

NATURAL FENCES AND BREAKWINDS

Botanical Name	Popular Name	Height Ft.	Habit	Remarks
DURANTA D. phanerii		6-8	Bushy, spiny	Flowers blue; summer; warm districts.
ESCALLONIA E. fretheyii		6-8	Bushy	Flowers pink; summer.
EUONYMUS E. aurea variegata		6-8	Dense	Ornamental hedge.
EUGENIA E. Smithii	Lilly-Pilly	10-12	Dense	Informal hedge.
ILEX I. aquifolium	English Holly	10-12	Very dense	Splendid for colder districts.
LIGUSTRUM L. aurea	Golden Privet	3-4	Dense	Popular garden hedge.
LONICERA L. nitida	Bush Honeysuckle	2-3	Dense	Suitable only for low hedge.
PHOTINIA P. glabra rubens P. robusta		3-5 6-7	Dense Dense	Young leaves bright red. Strong growing; leaves red when young.
PITTOSPORUM P. crassifolium P. nigrescens P. undulatum P. eugenoides		6-7 5-6 6-8 5-6	Spare Twiggy Dense Twiggy	Warm districts. Three variations; green, variegated, purple foliage. Large leaves. Best for frost districts.
PLUMBAGO P. capense		3-4	Dense	Light blue flowers throughout summer.
PYRACANTHA P. crenulata P. angustifolia	Evergreen Hawthorn Evergreen Hawthorn	4-6 5-7	Dense, spiny Very spiny	Bright red berries. Bright orange berries.
VERONICA V. parviflora	Bush Speedwell	4-5	Dense	Neat, compact.
VIBURNUM V. tinus	Laurastinus	4-6	Dense	White flowers; winter.

How to Grow Camellias

WITH correct planning it is possible to obtain a collection of lovely Camellias which will provide a succession of blooms over many months. The Sasanqua is the first species of Camellia to flower. Onigoromo starts blooming as early as March and is seen in full glory in April, soon to be followed in turn by the other Sasanas, which last into June.

The first of the Camellia Japonicas to bloom are *Arejishi*, *Daikagura*, *Hassaku*, *Lilian Pitts*, *Yoibijin*, *Yukumi Gurama* and *Japonica*, which make a brave showing early in April, with a few blooms even at the end of March. *Fimbriata*, *Alba Plena* and *Incarinata* come into flower in May, as also do *Aspasia* and *Duchess of York*, *Great Eastern* and *Thompsonii*. Other varieties follow in quick succession during June, July and August.

Camellias are not difficult or slow to grow, and with ordinary care and attention, once they are established, will produce from 12 to 18 inches of growth each season. Any reasonably fertile garden soil is suitable for them, but they will not withstand waterlogged conditions. Being acid-loving plants, lime, dolomite or any fertiliser containing same must be avoided.

They are ideally suited for our coastal and tableland climates, and do best in broken shade as provided by tall trees, or in a semi-shaded southerly or easterly aspect. There are quite a number of varieties, however, which flourish in full sunlight. In hot and dry inland districts they are best grown in a bush-house or in a shady and sheltered position protected from drying winds.

They must be kept copiously watered during the warm months of the year, and it is advisable to form a basin around the trunk of the plant to allow for thorough weekly flooding. The flower buds are formed

during early summer and attention to watering from November to February should ensure a wealth of blooms of great excellence and good size. A liberal mulch of leaf mould or well-rotted cow manure will help to conserve moisture and at the same time provide additional nourishment to the plants. When properly grown, Camellias are subject to very few pests. Leaf scale, which sometimes develops on lower branches, can be readily controlled by the use of white oil. The best time for spraying is late spring.

Terms Used to Describe Camellia Flowers

SINGLE: Consisting of from five to seven petals and a central group of stamens in an unbroken cylinder.

SEMI-DOUBLE: From five to seven outer petals and additional large petals, but not intermixed with the central stamens, e.g., the Czar.

INCOMPLETE DOUBLE: Outer rows of petals, stamens visible in the centre but intermixed with petals or petaloides, e.g., Elegans.

COMPLETE DOUBLE: No stamens are visible, e.g., Prince Frederick William.

A Camellia is said to be regularly imbricated when its petals overlap like the tiles on a roof, e.g., Otome.

FOR ALL SHRUBS AND PLANTS NOT DESCRIBED
IN THE SECTIONS, READ OUR INDEX GUIDE AT
BACK OF BOOK.



THICROMYRTUS CILIATUS

Australian Natives . . .

by IVO HAMMET

AMIDST the rush and turmoil of modern life one often hears the wish expressed: "Oh, I wish that I could grow a few wildflowers in my garden." The motive underlying the expression of this wish is, no doubt, the speaker's desire, maybe an unconscious one, to recreate at home the charm and restfulness of the Australian bush. It is by studying the natural habits of the plants to be grown, and by imitating, as far as is possible, their natural environment, that success may be attained in converting such a wish into reality.

Australian wildflower gardening means the growing of decorative plants which are natives of Australia.

It calls for a knowledge of suitable species for various purposes, and is, of necessity, informal. It has little in common with the formal style of gardening.

The more closely that natural conditions are imitated, the easier it is to grow wildflowers.

Therefore, if possible, set aside a portion

of the garden for them. However, if this is not practicable, it is possible to combine them harmoniously with the rest of the garden.

It must be remembered that ordinary garden plants have had, perhaps, centuries of conditioning to fit them to grow in a cultivated garden, and so the more that the garden is cultivated and the more that manure is applied the better are the results attained with them.

AUSTRALIAN NATIVES

Wildflowers usually thrive best where there is little root disturbance, where there is reasonable shelter, and where artificial forcing by means of manure is discouraged.

When starting the wildflower garden it is advisable to dig the ground available to facilitate the planting and to dispose of weeds.

Subsequent cultivation should be limited, if possible, to Dutch hoeing the ground, taking care not to hoe near the plants.

Gravel is Good

A mulch of coarse loose gravel about 2 in. deep is a good substitute for Dutch hoeing. It provides an insulated layer of soil, prevents wind and water erosion, and discourages the growth of weeds.

The value of stones in the garden is apt to be overlooked. Three-quarters of their bulk may be sunk in the ground, but they must be used with discrimination. They should be in harmony with their surroundings and of the same kind.

Thus, sandstone and basalt would not blend. If a strata shows, as in sandstone, the lines should be continuous, not opposed.

The roots of most plants just love to hug stones. The stones probably concentrate moisture and make it easily available to the plant, and they no doubt regulate the soil temperature and help to keep it uniform.

It is a common impression that wildflowers are straggly and unattractive. This is wrong.

Actually, they respond amazingly to careful placing in a garden, where they do not meet with the hard conditions which usually confront them in their native haunts, and they may be pruned, usually after the flowering period.

Most Geraldton Waxflower plants that are seen in gardens here become tall and straggly, but prune them back severely after flowering and see what a wealth of new growth develops next season.

Australia is approximately 2,000 miles long by 2,000 miles wide, and within this large area the plant environment differs very much. The rainfall may vary from 6 in. annually to 400, the climate may be tropical or alpine, and the soil may be alkaline desert or acid jungle.

It may be helpful to remember that acid soils are usually darker in colour and heavier in texture than alkaline ones, and that plants with sparse, leathery foliage of a grey or drab colour usually prefer alkaline soils, whilst plants with large leaves of a glossy green colour usually prefer acid soils.

Planting

The best time to plant is in autumn after rain has moistened the soil, but before approaching winter has reduced growth. If planting be done in spring, it will be necessary to water the plants carefully throughout the ensuing summer.

Small plants two or three inches high are best. Larger plants are frequently pot-bound and strangle themselves. Self-strangulation can occur also when the sub-soil has been too hard for the roots to penetrate.

Careful staking of young plants is desirable to prevent movement caused by wind; but if plants are grown close together they will give each other mutual aid by the branches interlacing. Care, however, is necessary to ensure that a plant of rampant growth does not crowd out a plant of more sedate growth.

A small saucer-shaped depression should be left at the base of each plant to permit of hand-watering, if required. Watering by means of a hose is undesirable and unnecessary.

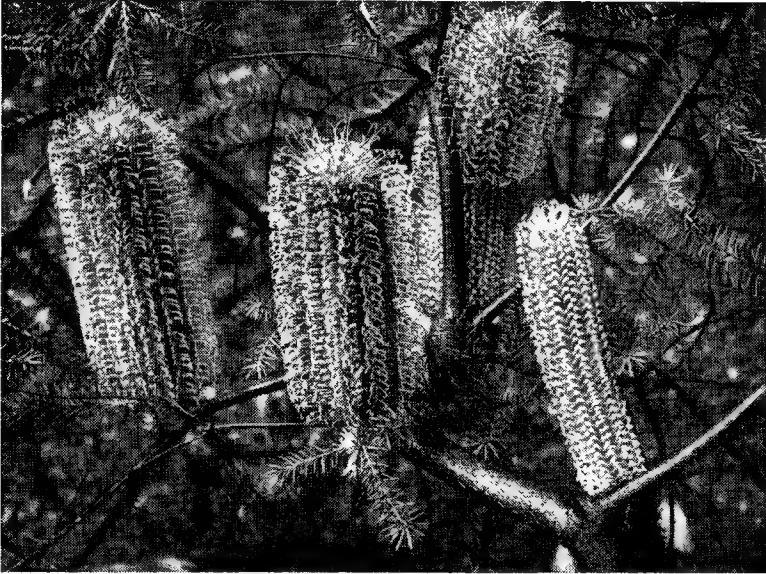
A limited amount of pruning is necessary to direct and control the plant's growth. The prunings may be cut up small and allowed to lie where they fall. Pruning should be done immediately after the flowering period, but pruning by pinching out young growing tips is very effective.

Propagation of wildflowers is much the same as that for other plants, particulars of which can be found in any standard gardening book.

Obtaining wildflower plants is sometimes difficult. No one nursery can supply everything needed, but contact with growers of wildflowers can be made through the help of the various horticultural societies.

Most wildflowers are protected, and a permit to gather plants is necessary whether they are on publicly or privately owned land.

AUSTRALIAN NATIVES



BANKSIA ERICIFOLIA

When obtaining plants, small ones about two or three inches high should be chosen. A plant in flower is always harder to establish than one that is not.

In considering what to plant, various factors must be considered, such as: Available space, type of soil, whether site is shady or

hot, exposed or sheltered, whether landscape effect is desired, or merely cut flowers.

In the following detailed lists of plants for special purposes, full consideration has been given to various desirable qualities, such as ease of cultivation, beauty of flowers or foliage, length of flowering period, and possibility of obtaining plants.

WILDFLOWERS FOR THE ROCKERY

MICROMYRTUS CILIATUS: Small trailing shrub, grows to about 1 ft. high, with pinkish or white flowers somewhat like thryptomene flowers; flowers continuously from August to October; good as a cut flower.

ISOTOMA AXILLARIS: Small herbaceous plant with blue flowers. Flowers continuously for about three months; no good for cut flowers.

CORREA PULCHELLA (or Wild Fuchsia): Apricot-red flowers. Flowers from July to September.

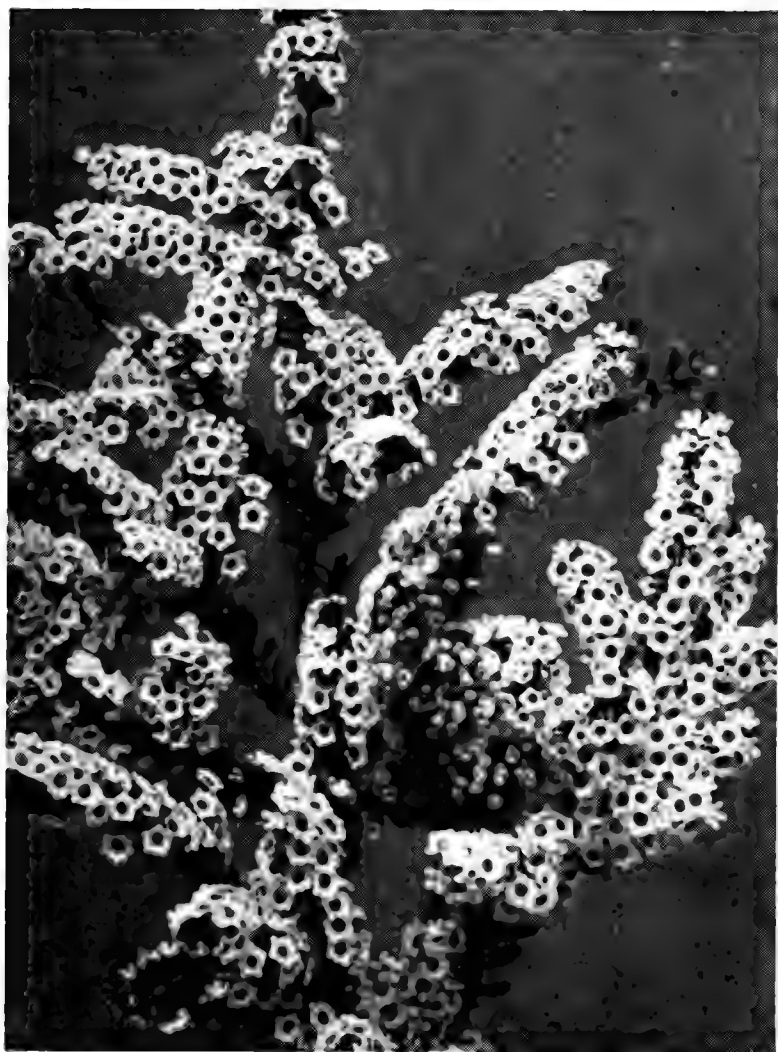
MYOPORUM DEBILE: Prostrate trailing plant; flowers insignificant, but mottled pink and white berries.

HARDENBERGIA VIOLACEA (or False Sarsaparilla): Spring flowering, purple flowers. [I know a sloping bank, about 10 ft. x 8 ft., which was always a harbour for weeds, but it was faced with loose stones (as a convenient way of disposing of them) and a *H. violacea* planted, and in spring it is a blazing mass of purple and the rest of the year the green foliage makes a bright show of the former untidy bank.]

KENNEDYA PROSTRATA (or Travelling Postman): A trailing plant with red pea flowers; spring flowering.

BAECKIA RAMOSISSIMA (Rosy Heath Myrtle): 8 in., small pink flowers; similar to flowers of the red tea-tree.

AUSTRALIAN NATIVES



THRYPTOMENE MITCHELLIANA

CALOCEPHALUS BROWNII (Cushion Bush): A straggly seaside plant with almost snow-white branches resembling fragments of white coral.

EPACRIS IMPRESSA: The common pink, white or red heath, is quite attractive as a rockery plant, flowering in winter.

LESCHENAULTIA BILOBA: Flowers are a glorious shade of cornflower blue.

VIOLA HEDERACEA: With purple and white flowers; flowers almost throughout the year. It is excellent also as a border or for a hanging basket, or just as an ordinary plant.

AUSTRALIAN NATIVES

SMALL PLANTS UP TO TWO FEET

ERIOSTEMON OBOVALIS: Fairy wax-flower, unrivalled as a cut flower; flowers July to September.

BORONIA MEGASTIGMA: Sweet-scented, with brown flowers; flowers from August to September.

BORONIA LUTEA: A yellow-flowered variety of the sweet-scented brown boronia, but easier to grow. Beware of snails, which like it.

BORONIA HETEROPHYLLA: Red flowers.

BORONIA DENTICULATA: Pink.
Most of the boronias like somewhat

damp, sheltered sites, and no root disturbance.

EPACRIS LONGIFLORA: Straggling shrub with long sprays up to 3 ft. long of red and white flowers; likes to straggle among other shrubs.

GREVILLEA LAVANDULACEAE: Red-flowered; likes somewhat dry site. This cannot be too highly recommended as a small spring-flowering shrub.

CHORIZEMA ILICIFOLIA: Reddish pea flowers; good as cut flowers; flowers over several months in the spring.

ACTIVE SHRUBS TO SIX FEET

CALYTRIX TETRAGONA (Fringe Myrtle): Pink spring flowers; likes somewhat dry site.

CALYTRIX SULLIVANII (Grampians Fringe Myrtle): White flowers.

THRYPTOMENE MITCHELLIANA: White spring flowers; splendid for cut flowers.

MELALEUCA FULGENS: Red bottle-brush; spring flowers.

MELALEUCA PULCHELLA: Purple; July to September; with very dainty claw-shaped purple flowers.

MELALEUCA TRICOPHYLLA: Purple.

MELALEUCA SUBEROSA: Reddish.

GREVILLEA ASPLENIFOLIA: Red toothbrush flowers; attractive copper-coloured serrated leaves.

GREVILLEA ALPINA: Orange and red claw-shaped flowers.

GREVILLEA PUNICEA: Spidery flowers of a brilliant red.

CHAMAELAUCIUM UNCINATUM: Geraldton wax-flower; likes dry, sheltered spot; sandy loose soil preferred; somewhat susceptible to frost. Pink flowers; unrivalled as a cut flower.

PROSTANTHERA ROTUNDIFOLIA: Variety *Rosea incisa*. A beautiful pink-flowered mint bush, flowering in the spring.

ACACIA MYRTIFOLIA: Yellow flowers; very quick grower.

CASSIA EREMOPHILA: Sweet-scented yellow flowers. Likes a hot, dry site, where it will flower for months. Similar Cassias of almost equal merit are *C. Chatelainiana*, *C. artemesoides* and *C. Sturtii*.

RICINOCARPUS BOWMANII: Pink or white flowers. No good as a cut flower, but of outstanding merit as a garden specimen.

PROSTANTHERA NIVEA, var. *Induta*: Purple flowers; dry site.

SHRUBS FIVE TO TEN FEET

BANKSIA ERICIFOLIA: Winter flowering; bears a profusion of apricot-coloured cones. Very bushy in growth. *Banksia Collina* is similar but not so bushy.

PROSTANTHERA OVALIFOLIA, *P. ROTUNDIFOLIA*, *P. SIEBERI*, *P. MELISSIFOLIA* are all purple-flowered mint bushes which like damp, shady sites. The fragrance of the foliage of these

mint bushes after a shower of rain is something to be remembered.

ACACIA PYCNANTHA: The golden wattle.

ACACIA SPECTABILIS: The Mudgee wattle.

CALLISTEMON SPECIOSUS: Red bottlebrush.

BOSSIAEA LINOPHYLLA: Bears thousands of small yellow pea flowers.

AUSTRALIAN NATIVES

AUSTRALIAN TREES AT HOME IN ANY GARDEN

There are hundreds of interesting types, but we list a few that are obtainable from nurseries:—

MELALEUCA STYPHELOIDES: White flowers and bark; 50 ft.

MELALEUCA NESOPHILA: Purple flowers, 15 ft.

MELALEUCA HUEGELLI: White flowers; 12 ft.

Most *Melaleucas* or paper-bark tea-trees like plenty of moisture.

EUCALYPTUS TORQUATA (or Coolgardie Gum): Pink flowers; 12 ft.

EUCALYPTUS CAESIA: Pink; 15 ft.

EUCALYPTUS PREISSIANA: Yellow; 10 ft.

EUCALYPTUS FORRESTIANA: Red seed cases; 15 ft.

EUCALYPTUS PERRINIANA: Unique blue leaves which encircle the stem; 15 ft.

EUCALYPTUS SEPULCRALIS: White stem with beautiful drooping branches; 12 ft.

EUCALYPTUS RISDONI: Grey stem; a tall, narrow tree; 30 ft.

EUCALYPTUS CITRIODORA: White stem, sparse lemon-scented foliage; 30 ft.

EUCALYPTUS NUTANS: Spreading red-flowered tree; 25 ft.

EUCALYPTUS LEUCOXYLON, Rosea var. *Macrocarpa:* Red-flowered iron-bark.

EUCALYPTUS FICIFOLIA: Well-known scarlet flowering gum.

PITTOSPORUM PHILLYROIDES: The weeping pittosporum; likes a dry site.

HAKEA LAURINA: Robin's pincushion; bears hundreds of red flowers; 12 ft.

ACACIA HOWITTII: A beautiful spreading tree with scented foliage and lemon-scented flowers; 15 ft.

ACACIA SUBPOROSA: Graceful drooping branches; likes plenty of moisture; 15 ft.

GREVILLEA BARKLEYANA: Striking red-tipped leaves and pink flowers; likes moisture; 15 ft.

GREVILLEA ROBUSTA: Silky Oak; golden yellow flowers; 25 ft.

MELALEUCA HYPERICIFOLIA: Red flowers; 15 ft.

MELALEUCA LATERITA: Red flowers; 12 ft.

CLIMBERS

PASSIFLORA CINNABARINA: Red flowers; glossy green leaves.

SOILYA HETEROPHYLLA: Bushy creeper with blue flowers.

HARDENBERGIA VIOLACEA and **H. COMPTONIANA:** Purple - flowered climbers.

CLEMATIS MICROPHYLLA and **C. ARISTATA:** White flowers.

CHORIZEMA VIRENS: Reddish pea flowers.

KENNEDYA RUBICUNDA: Red flowers.

KENNEDYA NIGRICANS: Black and yellow flowers.

FOR DRY INLAND AREAS

CASSIAS, *eremophilas, chamaelaucium uncinatum* (Geraldton wax-flower).

EUCALYPTUS *torquata, Stoaatii, Gillii Stricklandii, Burdettiana, mitrata, caesia, Oldfieldii, tetaptrea, Desmondensis, pyri-*

formis, eremophila, Preissiana, erythronema, Forrestiana.

ACACIA *aneura, brachybotrya, calami-folia, vestita.*

PITTOSPORUM *phillyroides.*

SHADE-LOVING NATIVE PLANTS

PROSTANTHERAS, or Mint-bushes.
BORONIAS.

CREEPERS, such as *Sollya, Clematis, Kennedya rubicunda, Acacia subporosa.*



Home Orchard...

by "ILLAWARRA"

GROWING your own fruit is part of the fun of gardening, for where space permits most pome, stone and citrus trees can be planted, but even if your grounds are not large enough for fruit trees there is usually room for strawberries, a grape vine or two, bush or bramble fruits, or passion vines. If necessary they can be made a part of your vegetable garden.

For a succession of fruits in the home garden plant the following:—

Strawberries, which fruit during summer and often again in winter, need planting out about March-April, but with care can be planted almost any time of the year. They are the first of the fruits to come into bearing.

In cold districts cherries would come next into bearing, but in warmer districts where cherries will not fruit early peaches or plums would be next. The gardener should choose early varieties such as Brigg's Red May, Watt's Early Champion; or, if plums, Santa Rosa, and Shiro, which will crop from October to Christmas in many districts.

Apricots usually come into bearing round about Christmas, also Lady Carrington Red apples. For successional crops of peaches plant Carmen or Christmas Box, Shanghai Seedling and Blackburn, which ripen in January. For February peaches plant Philip's Cling, J. H. Hale, or Wight.

For January and February plums plant Blood, Wickson, Kelsey Late, Grand Duke, Early Orleans or Coe's Golden Drop.

Currants and raspberries, gooseberries and other berry fruits usually come into season just before Christmas, but black currants

do not often reach the market before the New Year.

Grapes usually crop early in January and extend to about the middle of March. Passion fruits ripen when the heat is turned on round about January-February.

Apples and pears, other than the early harvest apples, such as Willie Sharp and Lady Carrington, do not reach any size until late summer and early autumn. Granny Smith can, however, be picked at almost any stage for cooking. Five Crown, Jonathan, Cleopatra and Allsop's Early will provide a range of fruit from January to March if picked when a few are wanted. From then on the range should be selected from Gravenstein, Jonathan, with Delicious, King David, Rome Beauty, McIntosh Red, Red Statesman, Yates and Democrat as late-comers. Study the pollination hints given under "Pome Fruits" and make your own selection. This also applies to pears, of which the earliest is Clapp's Favourite, then Williams or Bartlett, Baron de Mello, and the others for late fruit.

Nectarines are mid-season fruits, only one or two ripening before Christmas and the rest in January and February.

Citrus fruits vary according to the season. Late Valencia oranges often mature an inter-

HOME ORCHARD

mediate crop in February-March, but the rest are winter-fruiting types, except lemons, which usually hang the year round in mild districts.

Olives are late fruit and are best left until they begin to fall, when the crop should be gathered.

About the only fruit harvested in Australia during winter other than citrus are strawberries, persimmons and passion fruits. Practically all others are then dormant.

Selecting the Site

Aspect is important, and the matter of protection should also be considered, for fruit trees exposed to cold southerlies and westerlies or some other adverse prevailing wind rarely crop well.

While the average home gardener builds or buys a home because the situation or the price suits him, few consider the nature of the soil, the aspect, or the topography of the ground, unless they happen to be dyed-in-the-wool garden cranks. Yet to anyone who intends to grow his own vegetables and fruits as a means of reducing the annual home budget, these features are as important as a good water supply, modern sewerage, and other domestic amenities.

We must assume, however, that the soil is good to very good, for it is useless to try to grow fruit in pure sand, or to plant trees in ground that consists merely of heavy clay or is rocky or shaly, without any depth of topsoil.

Preparing the Soil

The ground should be dug over a full spade depth and all big stones, rocks, roots and stumps removed. While cleaning up one should examine the soil to ascertain its all-over depth, and if heavy clay is met with a few inches from the surface the digging should be performed carefully and little or none of this deleterious material brought to the surface at one time.

Perennial weeds such as docks, dandelions, lantana, couch, kikuyu, paspalum, and other grasses that may get out of hand, also oxalis and onion weed, should be dealt with and all cormels, roots, stolons and runners removed, piled on a sheet of iron to dry, and then burned. Where considerable areas of such weeds and grasses are encountered it may pay the intending home orchardist to spray the rubbish first of all with 24D or T.C.A., or, where blackberries abound, with 245T and amine salts combined. The preparation known as T.C.A. will sterilise

the ground for at least three months after application. Therefore it is necessary to allow ample time between treatment and planting, for young trees set out too soon would in all probability find much of the chemical still in the ground, absorb it, and die.

Good Drainage

If the land slopes to the back of the block the gardener should dig a few pot-holes and see how high the watertable lies. This is best done after rain. Such a spot is usually a good place for a few fruit trees, providing the ground does not become waterlogged for any length of time. The construction of rubble drains, the putting down of dry wells, 4 ft. square and 4 ft. deep, which are filled to within 9 in. of the surface with large rocks and then topped off with some soil and turf, or the laying of agricultural pipes to drain off the surplus moisture are the answer to water-logging.

Lime

Lime the soil after it has been dug over well, and let the rain carry it down through the clods. Normally the procedure in lime-deficient soils should be to lime the ground the first year, manure it each year for the next two years, and then lime again. Even the home gardener has to learn sooner or later that, unless he practises systematic manuring and thus replaces the plant foods removed from soil in the form of vegetables and fruit, the soil will soon become barren and refuse to produce crops.

Ground limestone, which is sold under the name of carbonate of lime, is a very effective form to use in the home garden for most purposes. Dolomite or dolomitic lime, which contains about one-third natural magnesium, is also useful, for it supplies both calcium and magnesium.

Planting

As most fruit trees are young and small when planted (two to three years old at most) it is not necessary to dig very deep holes and to incorporate huge quantities of manure and compost at the bottom as is sometimes recommended. The writer has obtained far the best results from most fruits by careful planting in good quality soil, followed by supplementary surface feeding year after year.

Nature feeds her trees from the surface under forest and jungle conditions as a

HOME ORCHARD

result of annual bark and leaf-shedding, piling up of flower petals, fruit remains, bird, animal and insect manure, and the remains of these creatures after death. Rains, heat and humidity cause the debris to rot, and the nutrients thus provided are carried down to tree roots to feed and to make it possible for them to continue cropping; and so it should be in the home fruit garden. No soil, no matter how rich and fertile, should be expected to crop continuously without being regularly manured, limed or fertilised.

When To Plant

When buying fruit trees, bear in mind that deciduous (leaf-losing) species should be planted when dormant or leafless. This is always during winter; therefore they require the utmost care and attention. Evergreen fruit trees, mostly citrus, some nuts, and olives, strike best if planted out in mid-autumn or during spring, after the soil has warmed up and is receptive. Citrus trees, for instance, are often sold during the coldest months of winter, and under such conditions, unless grown in tins or tubs, the leaves curl, turn yellow and die. Such trees should be avoided.

Remove all deciduous trees from the packing on arrival and stand them in buckets of tepid water, unless they are to be planted immediately. If they show any sign of withering, let them stand in water for some hours to plump up. Citrus trees that have yellow leaves and puckered or slightly withered wood on arrival should be similarly treated, and then planted in good moist soil, which should be firmed well all round.

When planting, dig holes big enough to take each tree easily with the roots extended well out. Do not dig a small hole and cramp the roots in. Plant each tree the same depth, as indicated by the "high water mark" on the trunk. Dome the earth slightly in the centre of each hole and extend the roots over this slight mound so that they are in as natural a position as possible. Then fill in the hole with moist, good quality earth and firm well, but do not pack the soil too tightly. Leave a saucer-shaped depression round each tree to hold water and then apply sufficient to give the tree a good start. If the weather is excessively dry at planting time, the hole should be filled with water several times and allowed to drain away. This will ensure moist surroundings that will last some time after planting.

Pome Fruit...

Pome fruits include apples, pears, quinces and medlars. The first three are the most popular, medlars rarely being seen in this country.

Apples

Apples, for the most part, do best in the cooler parts of the Commonwealth, such as Tasmania, southern Victoria, tableland and mountainous parts of N.S.W., hilly parts of South Australia, and the south-western portion of Western Australia and its highlands. This also applies to pears, but quinces appear to do quite well on the coastal sands and even in the hotter, drier inland areas of all States except Queensland, provided the water supply is good.

Apples and pears of most sorts are self-sterile, or varieties not entirely so crop better if cross-pollinated by another variety that flowers at the same time. The follow-

ing list of desirable and popular apple varieties gives the pollinator in parentheses: *Cleopatra*, a large yellow, heavy cropping, long-keeping apple suitable for dessert or cooking, needs a cool district for best results (Granny Smith or Jonathan); *Delicious* is a fine flavoured, prolific cropping, late-keeping, coloured apple that also needs cool district conditions (Granny Smith, Jonathan); *Democrat* is a highly coloured first-class late apple and a good keeper (Granny Smith, Jonathan); *Five Crown* or *London Pippin* is a large yellow apple suitable for both dessert and cooking, needs cool district, but does well on the hills around Sydney and further north (Rome Beauty, Delicious).

Granny Smith is probably the most popular late apple grown in this country. It is a greenish-yellow in colour and does well almost everywhere, even on the coast (Jona-

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than, Democrat); *Gravenstein*, medium to large apple, red with yellow stripes, of good crisp flavour, but does not hang on the trees very long once ripe (Granny Smith, Jonathan); *Jonathan*, large-sized yellow apple with red cheek, very tasty a mid-season fruit (Granny Smith, Democrat); *King David*, rich dark red apple with yellowish flesh, suitable to cool districts only (Delicious, Granny Smith); *Lady Carrington Red*, small yellow apple, red cheeks, poor keeper, very subject to fruit fly, early, usually ripens before Christmas (Allsop's Early); *McIntosh Red*, creamy yellow apple with red cheeks, late, regular bearer and long keeper (Gravenstein, Jonathan); *Rome Beauty* is a large apple, yellow striped red, good keeper, late variety (Five Crown).

Pears

Pears are also self-sterile and are very slow croppers. They do best in moist, deep soil, and require shelter. They begin to crop from the fourth to the seventh year after planting.

The best varieties are: — *Williams* or *Bartlett*, yellow with red cheek (pollinator Beurre Bosc); *Packham's Triumph*, a large greenish very juicy pear, of good keeping quality, and one of the best (Josephine De Malines); *Josephine De Malines*, medium size, greenish yellow, juicy and fine flavoured, and late, good keeper (Packham's); *Beurre Bosc*, large, very long, rich brown russet colour, good keeper, very late (Williams); *Winter Cole*, medium-sized pear, greenish yellow, good cropper and keeper, late, needs cold district (Williams); *Winter Nelis*, medium size, russet, good cropper and keeper, late (Baron De Mello).

Stone Fruit . . .

Peaches and Nectarines

Peaches and nectarines require similar conditions and begin bearing from their first to third year from planting. In districts such as Sydney, where fruit fly infestation ruins the bulk of all stone and other summer fruits, only early varieties of either should be planted, otherwise the gardener will need to splash the foliage of the trees at least once a week with nicotine sulphate, DDT, sugar and water, in order to reduce the fly population.

Quinces

Quinces are purely cooking fruits and make excellent jam or preserves. They are very hardy trees and will thrive in moist, low positions where other fruits will not grow. They crop from the second to fourth year from planting. It is one of our most ancient fruits and does not appear to have changed its form or type for many hundreds of years, if illustrations in old herbals are to be relied upon.

Although the quince will thrive in low, moist spots, it does even better when given space in rich, loamy, well-drained soil. They require at least 20 square feet of space because of their spreading habits. Suckers that spring up from the trunk bases should be removed early from well below the ground. These suckers should not be used for propagating, as they always tend to sucker again.

Quinces, unlike other pome fruits, bloom on the new wood of each season. For this reason one has to be careful not to remove the younger bearing wood when pruning. The best varieties are: — *Champion*, which has large fruits that carry well, keep well and are excellent for canning or preserving; *Portugal*, large, oblong fruits, rather paler coloured than other quinces, turns pink when cooked; *Fuller*, a very early variety, heavy cropping and flesh tender; *Missouri Mammoth*, enormous fruit with smooth skin and mild flavour; *Pineapple*, clear golden yellow fruit, one of the best for jelly-making; *Red's Mammoth*, large early variety, and *Smyrna*, long-keeping, good-flavoured fruit in abundance.

For summer treatment of quince trees, pinch back the terminals of dormant leaders; disbud surplus and misplaced shoots and thin out superfluous leaders and laterals late in summer.

The peach, being easily the most popular of all summer fruits in Australia, it naturally follows that there is a wide stretch of country suited to its cultivation. It is grown out of doors in all States, and without the aid of sun-catching walls and similar devices resorted to in Europe and parts of North America. Trees are usually propagated by grafting them on to peach seedlings, but the buds or grafts take equally as well on nectarine, plum, apricot or cherry stocks.

POPULAR VARIETIES

Although not a long-lived tree, the peach can be kept fruiting for 15 to 20 years with judicious pruning. For this reason it is often used as a filler between rows of apples or pears, the peaches being removed when more room is wanted for the longer-lived pome fruits. Peaches grow best in rich, sandy loam, but will bear quite satisfactorily in even poor sand provided the water supply is good and the trees are fed occasionally from the surface.

It is important that peaches should be thinned after the fruit has set. This, indeed, is a practice that needs to be followed but is much neglected by most amateurs with practically all types of fruits, which set far too many for the good of the tree. The time occupied in thinning out the crop will be well spent, for it results in the production of fewer fruits but all of greater size and quality. The job should be done before the pits have hardened.

The best varieties of peaches are: *Watt's Early Champion* (ripens November), an early slipstone of dark red colour, needs heavy pruning and thinning; *Brigg's Red May*, well-known early variety, rather shy cropper, semi-clingstone, but good flavour; *Bell's November*, ripens early November, good for coastal N.S.W. gardens; *Edward VII*, another early peach, ripens early November, does well along N.S.W. coast; *Flat China*, popular on N.S.W. north coast, slipstone type; *Hale's Early*, large bluish red, early peach, good flavour, slipstone; *J. H. Hale*, the only peach that requires pollinating (Blackburn); *Mayflower*, very early, fruit large, good colour all over; *Golden Queen*, one of the best preserving peaches; *Phillips Cling*, fruit large, yellow to the stone, which is small, good preserver, ripens end February; *Pullar's Cling*, very large, highly coloured clingstone peach, and one of the best for canning or home preserves.

Nectarines

Nectarines are frowned upon by gardeners in districts where fruit fly is common, because they are said to attract these pests by their strong smell. Whether this is so or not the writer is not prepared to say, but one is certain that, wherever the nectarine grows in coastal N.S.W., the fruit fly is not far away. As said previously, they require similar soil and treatment to that accorded peaches. Pests and diseases common to peaches, such as leaf curl disease, shot hole, and rust, also attack nectarines.

Probably the earliest nectarine is *Irrewarra*, which ripens in November, has highly coloured flesh and free stone. It is recommended for districts where fruit fly is very troublesome, as the fruit is usually finished before the scourge becomes numerous.

Other nectarine varieties are:—*Goldmine*, large bright red fruit, slipstone, sure bearer, mid-season; *Albert Victor*, large fruit, free-stone, ripens first week January; *Elrudge*, good large fruit, rich and juicy, ripens January; *Early Rivers*, large slipstone type, bright red, very early; *Fertile de Poitu*, extra large fruit, freestone; *Masterpiece*, large attractive fruit, small stone, late variety; *Newboy*, large crimson fleshy fruits, slipstone, mid-season; *Cardinal*, medium to large fruit, bright red, very early, good cropper; *Quetta*, immense, richly coloured fruit with white flesh, good bearer.

Plums

For some strange reason the delicious plum is not nearly so popular in this country as it deserves to be. The trees produce enormous crops of easy-to-grow, easy-to-pick, easy-to-preserve and easy-to-eat fruit, yet not nearly so many plums as peaches are sold by nurseriesmen throughout Australia. The reason is difficult to find, other than perhaps that one peach will pollinate itself but two or more varieties of plums are needed to grow in the garden to assure a crop. English plums and prunes do best in the cooler districts of Australia, but the Japanese types appear to suit the warm climates, although some of them produce quite satisfactorily on the higher country and some of the English types in the warm coastal strips.

Plum trees should be well pruned when young to check the rather straggly natural habit of the trees. Once the trees are well covered with fruiting spurs only the long top growths, which are normally beyond reach, need much cutting back. Plums are usually propagated on plum seedling stocks, but do equally as well on peach or apricot. Summer pruning confers great benefit upon plums if the leaders are shortened after the crop has been harvested. They will then make short growths, which will ripen and bear fruit the following season.

It naturally follows that plums, being such heavy bearers, need gross feeding in order to mature their tremendous crops. If the soil is naturally good but needs stimulus, apply a good commercial fertiliser containing plenty of blood and bone, with

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some sulphate or muriate of potash added. Water the trees well when the fruit is setting, and keep the hose or can going in order to maintain fruit growth.

Best English plum varieties are:—*Angelina Burdett*, early, dark purple, heavy bearer (pollinators, Diamond or Grand Duke); *Grand Duke*, late plum, and one of the best, purplish black, flesh yellow (pollinator, President); *President*, very late, large, cold climate plum (Grand Duke or Angelina); *Green Gage*, mid-season, green, fine flavour, requires cold climate (Coe's Golden Drop); *Coe's Golden Drop*, late, large, light coloured, juicy plum (Grand Duke); *Diamond*, immense, almost black fruit, tart-flavoured (Angelina); *Evan's Early*, medium size, blackish purple and early (Angelina); *Early Orleans*, large fruit, purple colour, good cropper, slipstone (Angelina or Diamond).

JAPANESE PLUMS: *Burbank*, cherry red, great cropper (Santa Rosa); *Climax*, bright crimson plum of good flavour, ripens about Christmas (Santa Rosa, Wickson); *Kelsey Late*, extra large heart-shaped plum, turning purple, scalds easily on coast, good inland, late (Santa Rosa); *Narrabeen*, extra large, very sweet, heavy bearer, ripens early February (Santa Rosa); *October Purple*, mid-season, large purple, flesh yellow, clingstone, prolific (Santa Rosa); *Red Heart*, one of the best dark red plums for all purposes (Santa Rosa); *Santa Rosa*, large, oval, purplish crimson, good cropper, ripens Christmas, upright grower and very good, self-pollinating; *Satsuma*, Japanese blood plum, fruit large, dark red to stone, which is small, early, self-pollinating; *Wilson*, medium size, bright crimson fruit, ripens November (Santa Rosa); *Wickson*, very large, heart-shaped, yellow, red cheek, slipstone, prolific bearer, good for home use, ripens middle of January (Santa Rosa, Satsuma).

Apricots

These splendid fruits are grown successfully over a wide area of country stretching from Queensland to Victoria. Those grown in coastal N.S.W. and Queensland mostly ripen by December, but the later varieties produced in cooler districts crop from January to the end of February. The apricot bears its fruit on spurs through the old wood and along new growth. Most varieties are self-pollinating. The early varieties are usually regarded as of poor

flavour, rather stringy and very small. The later sorts, such as *Trevatt*, *Moorpark* and *Hemskirke*, are of better size and quality. These are in keen demand by housewives who make jam and preserve their own fruit. The best early apricots are *Early Moorpark*, *Newcastle Early*, *Oullin's Early Peach*, and *Camden Superb*.

Apricots for the most part do best on the higher country round Sydney, and on tablelands, but do not crop well in very frosty districts because late visitations often affect the blossom. They should be given similar positions, protection and soil to those suggested for nectarines and peaches.

Cherries

Cherries are a cold climate crop and cannot be grown in coastal areas of N.S.W., except in the extreme south, where even there results are usually poor. They are true hillbillies of the fruit world, and need in N.S.W. an altitude of at least 500 ft. Further south, cherries crop reasonably to very well. Cherries flourish quite well in parts of Victoria where the orange and lemon crop satisfactorily; therefore, it would seem, there is room for some definite experiments along these lines, for they fruit most satisfactorily in coastal California, where the climate is very similar to if not warmer than that of N.S.W. from Sydney northwards.

The cherry is the earliest of all stone fruits to crop; therefore it is worthy of more than ordinary care and attention. The crop is usually finished by the first week in the New Year. Cherries are usually budded or grafted on to Mazzard stock, and require sound drainage, as they are extremely susceptible to collar rot and other fungal troubles. Deep, rich, well-drained loam produces big trees that live to a great age. The chief pests of the cherry are birds and the cherry slug. The use of DDT on trees in early spring gives good control of slugs, but small-mesh netting is suggested where birds cause trouble to the fruit.

Cherry trees need feeding every year because of the heavy crops carried by the trees. Animal manure is the best for this purpose, and the ground should be given a sound liming every third year. Cultivation of the soil round but not too close to the trees during winter, to conserve moisture, is very necessary, particularly if the spring weather should be dry.

CITRUS FRUITS

Cherries require little pruning beyond pinching out during spring of unnecessary growths. Practically all varieties are self-sterile, which means that they all need pollinators of a different variety to be grown nearby. Following are the best varieties for the home garden:—*Bedford Prolific*, mid-season, handsome black (pollinator, *Biggareau Napoleon* or *Early Rivers*); *Biggareau*, mid-season fruiting (St. Margaret or Florence); *Biggareau Napoleon*, bright red fruit with firm white flesh (St. Margaret, Florence); *Black Eagle*, early (Early Lyons); *Black Tartarian*, strong grower, large fruit (Biggareau Napoleon, Florence); *Burgsdorff's Seedling*, large dark red, heavy bearing, early and best for coastal and early districts (Early Lyons and Early Rivers); *Early Lyons*, strong grower and bears regular crops of large fruit, one of the best early cherries (Bedford's Prolific); *Early Rivers* (Biggareau, Napoleon); *Early Purple Guige*, very early, good cropper (Early Lyons); *Florence*, bright red, late variety (Bedford's Prolific, Early Rivers); *St. Margaret*, one of the best late black cherries (Biggareau).

Figs

Figs are probably more popular as a backyard crop than commercially, for the reason that they do not carry well in the green state but have to be processed and dried. They require no special treatment other than good deep, moist soil. Some of the best fig trees the writer has seen were watered almost entirely from the waste that came from the laundry pipe in unsewered areas after it had run through a grease-trap. Fig trees, given some attention each year in the way of feeding and watering, grow into fine shade trees and produce enormous crops of fruit. They require little pruning. The best varieties are:—*Black Genoa*, large and juicy; *Blue Provence*, small but abundant and good-flavoured fruit; *Brown Turkey*, luscious, one of the best drying varieties; and *White Adriatic*, large fruit, red flesh.

Citrus Fruits . . .

Citrus fruits includes oranges, lemons, mandarins, grape fruit, limes, citrons, and shaddocks. They require deep, rich, free, well-drained soils for best results, although they seem to thrive in a variety of soils in different parts of Australia. Three things

Persimmons

Persimmons, or date plums, were one of the most popular fruits on the market 40 years ago, but in recent years have gone out almost entirely. They are an ideal home garden fruit tree, however, shedding good shade and providing large yellow fruit, which, when ripe and soft, is rich and luscious. They will grow in almost any part of Australia except the tropical north, and will even resist light frosts, blooming in winter. The best varieties are:—*Dai Dai Maru*, *Nitaro*, *Tanenashi*, *Tsuno Marghari*, and *Yemon*. They like rich soil and moisture in hot weather.

Mulberries

Mulberries are strictly a back garden crop today. There are two accepted types under cultivation here, the English and the Cape varieties. The Black English mulberry requires high, cold country, or the fruit will not set well. It is very subject to black spot in warm, humid areas. The Cape mulberry is more suited to the coastal and warm areas of N.S.W. They appear to do best in light to medium loamy soils, but need ample moisture when flowering and fruiting. Hicks variety, of sub-acid flavour, often crops twice a year.

Olives

In recent years, since large numbers of Southern Europeans migrated to this country, the olive has been in keen demand. It will grow in almost any soil that is well-drained and contains plenty of humus, and rapidly grows into a hardy, evergreen, ornamental tree. Given regular manuring and watering, the olive will crop for many years. The fruit is suitable for pickling, canning and oil-making. The best varieties are:—*Manzanillo*, for green or ripe pickles; *Sevillano*, another good pickling type; *Lucca*, makes good oil; *Hardy's Mammoth*, suitable for both oil-making and pickling, and *Black Italian*, the best variety for pickling.

they dislike — frost, strong winds and drought.

Most of them are very subject to scale insects of many kinds, but white oil spray will invariably give control. Aphids are troublesome during flowering period, and

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should be sprayed with DDT or nicotine sulphate. White wax scale is a serious pest, which can only be removed in the adult stage by means of a stiff-bristled brush. White oil will control the baby scales if applied from December to January, but all adults must be removed first.

One of the most baffling troubles associated with citrus trees is the shedding of immature fruits when about as big as marbles. The reason for this has never been accurately defined, but is probably due to lack of nitrogen and some other nutrient element, and possibly accentuated by dry conditions. The writer has overcome this shedding on several occasions by first liming the ground round trees heavily, and six weeks later applying ample fresh cow or horse manure, which was watered in well. Later applications of poultry manure, plus a good top-dressing of superphosphate and potash, also proved helpful.

Oranges

Oranges grow very well in many parts of the Commonwealth from Queensland to Melbourne, Adelaide, and well down the W.A. coast, and wherever the orange thrives, it is said, the lemon will be sure to grow. *Late Valencia* is one of the finest varieties in existence. It usually bears an intermediate crop every second year. It is the most suitable of the good oranges for coastal N.S.W., but the commons, which include *Paterson River*, *Joppa*, *Jaffa*, *White Siletta*, *Mediterranean Sweet*, *Parramatta*, and the marmalade orange, the bitter *Seville*, can also be grown over a wide area.

The *Washington Navel* is a fine orange that does best inland under irrigation conditions. When grown near the coast it rarely crops very satisfactorily, and causes much disappointment by its sparse fruiting. In such districts the *Valencia*, which is not seedless, should be grown.

Lemons

Lemons need similar treatment to oranges. The best varieties are:—*Lisbon*, on a thorny tree; *Eureka*, thornless, early bearer; *Meyer*, roundish type, withstanding frost, and *Villa*

Franca. *Sweet Rind* is now recognised as *Eureka*.

Mandarins have gone out of favour with commercial citrus growers in recent years owing to bad prices and transit losses, but there is no reason why they should not be grown at home. The best varieties are *Emperor*, one of the finest; *Ellendale Beauty*, an improved *Beauty of Glen Retreat*, hangs well; *Beauty of Glen Retreat*, enormous cropper, mid-season; *Imperial*, earliest variety in cultivation; *Thorny*, small, firm, good flavour; and *Cumquat* or *Kumquat*, a dwarf type with very small, firm fruit, which is mostly used for preserving whole or marmalade-making.

Limes

Limes are not much grown in Australia, although of excellent flavour and a most healthful fruit. They are mostly grown in North Queensland, where lemons are not successful, and are used for the same purpose. *East Indian* and *Tabitian* are the types grown, the latter nearly seedless.

Grapefruits

Grapefruits caught on here during the Second World War, owing to the American demand, but have never really occupied the position in human diet in this country that they have done in U.S.A. It is, however, an excellent fruit, containing many food essentials, and should be grown by all who are raising children. It requires about 25 ft. of space, as the trees grow very large. Soil similar to that recommended for oranges and other citrus is suitable. Varieties are few, the best being *Marsh* (almost seedless), *Thompson* (an improved *Marsh*), and *Wheeny* (suitable for coastal districts). They are called *Pomelos* in Western Australia.

Other citrus fruits often available from nurseries include the more ornamental varieties of *Cumquat*, *Citrangquat* (a hybrid between the *Citrangle* and *Cumquat*), and *Tangelos* such as the *Thornton*, a *Tangerine-Pomelo* hybrid. The *Tinuera Tangelo* is a cross between a mandarin and grapefruit.

Vines . . .

Grapes

Grapes should be in every garden where they can be grown. Grapes may be planted from May to August in most districts and,

as there are many varieties available, are suitable for home gardens from Queensland to Victoria, South Australia, and Western Australia. Large areas have been

BRAMBLE FRUITS AND BERRIES

planted in N.S.W., and some of the vineyards are well over a century old.

Once established, table grapes require little attention beyond preventive spraying with Bordeaux mixture for mildew and black spot, and insecticidal spraying for the control of grape vine moth grubs and blister mite. Pruning consists of cutting back to sturdy buds during the dormant season. The vines should be fed well every year with old manure and compost, particularly if of heavy-yielding character.

The best varieties to grow for the table are *Black* and *White Muscat*, *Black Hambro* (best coastal variety), *Improved Isabella*, *Waltham Cross* (suitable to warm districts), *Black Malaga*, *Black Sherry*, *Gordo Blanco* and *Golden Chasselas*. *Muscat Hambro* is an abundant bearer, of good flavour, and a good coastal grape.

Grapes need full sunlight and good, well-drained soil. As they often stand for a century or more, if cared for, the soil should be the best obtainable. Vines, if allowed to extend and develop many laterals, should be given some strong support. Some grapes, indeed, do best when given an overhead trellis. Those in this class are

Isabella, *Almeria* and *Black Hambro*. They grow so large that they should be given at least 25 ft. of space when planting.

Passion Vines

Passion fruits (*Passiflora edulis*) and the so-called banana passionfruit (*Tacsonia mollissima*), are also suitable for home growing. The former is a generous-fruited vine that lives for four or five years, and should then be replaced. For that reason some young plants should be grown each year to take the place of the older vines going out of production. It bears two crops a year, the summer crop ripening from February to March and the winter crop in July. This is one of the easiest fruits to grow and should be in every garden. Given some wire-netting or a trellis to scramble over, it is not uncommon for one vine to yield 30 or 40 dozen fruits a year. The ingredients for success with passionfruit consist merely of buying healthy vines, good soil, plenty of water, and some protection from adverse winds.

The banana passionfruit is famous for the brilliance of its cyclamen-covered tubular flowers, which are exceedingly beautiful.

Bramble Fruits and Berries . . .

The bramble fruits include raspberries, dewberries, newberries, youngberries, boysenberries, loganberries and hybrid forms of the original raspberry and blackberry. But berry fruits today include red, white and black currants, gooseberries, strawberries, blueberries, and possibly cranberries.

The bramble berries need proper nutrition for growth and cropping, and protection against the ravages of insect pests, diseases and birds. Heavy annual applications of manure have been found to return huge crops with all bramble fruits and most of their cousins, the bush or berry fruits.

Pruning of bramble fruits should rightly be done as soon as the crop has been harvested. The removal of the old canes relieves congestion and enables the young ones to ripen fully. Where young canes are crowded a few should be pruned out. In

early spring the cane tips should be removed. This encourages the production of better fruit. If tipping is done in winter the top buds are inclined to die out, and if done in late spring much bleeding from the tops of the canes may result. Feed the canes well each year during winter with old manure; but remember that all of the bramble fruits are shallow rooters, therefore the soil must not be worked too deeply — only enough to create a surface mulch.

Protect bramble fruits from birds by means of fine-mesh wire netting or string nets.

The youngberry is a cross between the loganberry and dewberry; the boysenberry is probably an improvement on both the loganberry and the youngberry. All of these make excellent jam and preserves, and offer no great difficulty to the amateur gardener to raise to perfection.

Bush Fruits . . .

Currants and gooseberries are grown mainly in Tasmania and the coldest parts of N.S.W. and Victoria. They need rich, deep soil that contains a lot of humus, and need regular additions of nitrogenous manures each year to keep them in good condition. Correct cutting back and pruning of these bush or berry fruits has much to do with their cropping satisfactorily. The object of pruning is to stimulate fruiting growth and to produce new shoots. Branches of black currants that have fruited freely should be cut out in winter, and also any weak growth, but bear in mind that excessive cutting back reduces yields.

Red and white currants differ in their pruning requirements from the black currant. In their first year from planting they should be cut back to within 6 in. of the ground, and from subsequent growths in the second year five balanced and strong growths should be chosen. These are the primary growths and are pruned back to 5 in. All other growths are cut away to two buds. This system is continued the following season, and eight well-chosen shoots are cut back to 8 in. and all other growths pruned. This work is all done during the summer. The best time in summer to do the job is when the shoots are becoming woody about mid-January, or, if the season is wet, mid-February.

Unlike other countries, currants, gooseberries and raspberries are merely sold in Australia under those names and not given any great varietal range. This is perhaps

a pity, and shows that little interest in the improvement of these tasty little fruits has been undertaken by plant breeders.

Gooseberries are surface feeders and derive much benefit from surface mulches of manure in spring. This should preferably be old litter, as too much nitrogen makes plants susceptible to mildew. A sound mulch of old farmyard manure round each bush every alternate winter has been found beneficial in many districts. Gooseberries are produced from well-ripened annual wood; therefore the object in pruning is to obtain well-ripened wood. Shoots causing overcrowding should be removed. If desired they can be treated as cordons or standards.

Strawberries

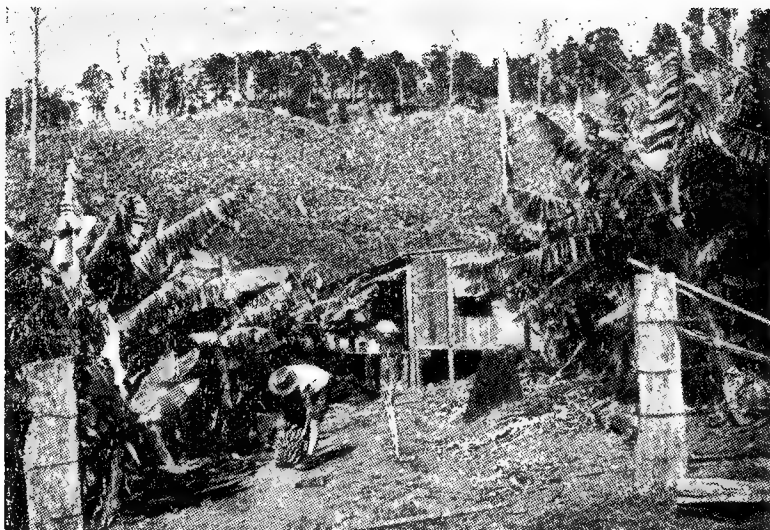
Strawberries are everyone's favourites, and can be grown in a variety of soils and climates from Queensland to Tasmania. Provided the soil is well endowed with humus, the water supply is good, and drainage adequate, they offer no difficulties. They soon develop runners, and unless these are required for propagation they should be cut off.

Outstanding varieties for home conditions are *Mason's Immense*, *Richmond Red*, *Preston's Special*, *Ettersburg*, *Hawkesbury*, *King Edward VII*, *Phenomenal*, *Rhodes Special*, *Creswell's Seedling*, *Fendelcino*, and *Vonnet*.

Strawberries can be kept off the ground by means of small forked twigs.

DISTANCE APART TO PLANT FRUIT TREES

APPLES (standard trees) — 25 to 30 ft. apart in rows 30 to 40 ft.
 PEARS (standard trees) — 18 to 25 ft. apart in rows 18 ft. to 25 ft.
 PLUMS (standard) — 20 to 30 ft. apart in rows 20 to 30 ft., according to variety.
 CHERRIES (standard) — 30 to 40 ft. apart in rows 30 to 40 ft.
 PEACHES and NECTARINES (standard) — 20 to 25 ft. apart in rows 25 to 30 ft.
 APRICOTS (standard) — 20 to 25 ft. apart in rows 20 to 25 ft.
 MULBERRIES — 20 ft. apart in rows 20 ft.
 OLIVES — 20 ft. apart in rows 20 to 25 ft.
 LOQUATS — 30 ft. apart in rows 30 ft. apart.
 QUINCES — 20 to 25 ft. apart in rows 25 to 30 ft. apart.
 PERSIMMONS — 25 to 30 ft. apart in rows 30 ft. apart.
 FIGS — 18 to 20 ft. apart in rows 25 ft. apart.
 PASSION VINES — 10 to 12 ft. apart in rows 12 ft. apart.
 GRAPES — 10 ft. to 20 ft. apart according to variety, space rows 20 ft.
 CURRANTS — 5 ft. 6 in. apart in rows 5 ft. 6 in. apart.
 GOOSEBERRIES — 5 ft. 6 in. apart in rows 5 ft. 6 in. apart.
 RASPBERRIES and other bramble fruits — 2 ft. apart in rows 5 ft. 6 in. apart.
 STRAWBERRIES — 16 in. apart in rows 3 ft. apart.
 ORANGES, MANDARINS, LEMONS — 20 ft. apart in rows 20 ft. apart.
 GRAPEFRUIT — 25 ft. apart in rows 25 ft. apart.
 CUMQUATS — 10 ft. apart in rows 10 ft. apart.
 CITRONS and SHADDOCKS — 20 ft. apart in rows 20 ft. apart.



Tropical Fruits . . .

THE nutritive value of fruits is due mainly to their content of sugar, starch and vitamins and, to a lesser extent, to cellulose fruit acids and pectic substances. Many fruits are important sources of essential vitamins, particularly ascorbic acid (vitamin C), and from this aspect tropical fruits are more valuable than those grown in temperate climates.

These fruits are far more valuable nutritionally than apples, pears, peaches, plums, grapes, and cherries, which form a large part of the fruit diet of most people in southern Australia.

AVOCADO

The flesh has a smooth, buttery texture, due to the high oil content, which increases as the fruit matures and varies considerably with variety.

The avocado belongs to the cinnamon-sassafras family, but is the only one of this family that is cultivated for its edible fruit. The tree is evergreen, or nearly so, some varieties dropping their leaves just

prior to flowering, leaving the tree bare for a short time.

Description of the Fruit

The fruits of the avocado vary in size and shape, ranging from 1 to 6 in. in diameter, from an oz. to 3 or 4 lb. in weight, and from almost round to long and slender pear-like in shape, some possessing a curved neck similar to a small crook-neck squash. The colour ranges from light or yellowish-green to dark green, purple to purplish-black, maroon or brown.

Some of the varieties of the avocado are *Fuerte* (prolific in N.S.W.); *Dickenson*, a heavy-cropping variety; *Anaheim*, one of the

TROPICAL FRUITS

most popular American varieties, and *Eastwood*, a locally selected seedling that is proving a vigorous, prolific, early cropper.

With the addition of plenty of water at regular intervals, and a well-balanced framework being constructed during the early life of the tree, excellent results should be obtained. Little or no pruning is necessary apart from dead wood or crossing limbs. Harvest when the fruits drop from the tree.

BANANAS

This well-known fruit has a high food value and, being particularly rich in sugar when ripe, can almost be classed as an energy food. When ripe, as indicated by a yellow skin flecked with brown spots and a softening flesh, all the starch has been changed to sugar and the banana is easily digested.

Choice of District and Locality

The first point for consideration by the prospective grower is the choice of a district, then a general locality in that district, and afterwards a particular site in that locality for planting. It is not an easy matter to decide this question of one district compared with another. Factors to be carefully considered are the questions of freedom from major diseases and pests, and climatic conditions (rainfall and its distribution, temperature, etc., especially during the winter periods).

Importance of Shelter

After the district and general locality have been selected, the question of a particular site should be decided. In this relation, shelter is of first importance. The value of shelter from southerly and westerly winds cannot be too strongly stressed, for it is a most essential factor in the future productivity and permanence of a plantation.

Climate

The banana requires climatic conditions approximating as closely as possible those characteristic of the tropics. Heavy and consistent rainfall, with regular high temperatures and humidity, is necessary for optimum growth. Adverse climatic condi-

tions make banana production impracticable, and planting should therefore be carried out in localities where the maximum protection against cold can be secured.

Soil

The banana is more cosmopolitan regarding soil conditions than has been generally admitted. It is now grown on soils of very variable character, and is much better adapted to some soils than to others. Depth of soil is a necessary requirement and, although bananas like an abundance of moisture, it is also essential that the soil be well drained.

Food bananas are seedless and raised from suckers from the root stock; these fruit a year from planting. The plants throw up clumps of shoots consisting of sheathing leaf-stalks, from the centre of which emerge the drooping flower-spikes, "female" flowers at the base and "males" at the end. (Actually, the flowers are hermaphrodite, but one sex is functionless at each end.) Clumps should be kept thinned down to about six shoots. Shoots that have fruited are cut down and used as a mulch. *Golden Gros* is the variety preferred in Western Australia.

BANANA PASSIONFRUIT

This fruit grows well along the New South Wales and Western Australian coasts, but is not very well known. It has a very attractive flavour, and is rich in vitamin C. Cultivate the same as normal passionfruit, and the fruit is ripe when a deep orange shade.

CUSTARD APPLE

The custard apple is low in vitamin C, but still contains twice as much of this essential vitamin as apples and apricots.

The more common varieties seen in Australia are:—(1) The netted custard apple, or bullock's heart; (2) the prickly custard apple, or sour sop; (3) the scaly custard apple, or sweet sop or sugar apple; (4) the Cherimoya or Peruvian custard apple.

Experience over a period of years has shown that the first three species are more adapted to and thrive better in the tropics, whereas the Cherimoya custard apple, besides being a better commercial type of fruit, is more suited to the sub-tropical condi-

VARIETIES AND THEIR CULTIVATION

tions of the north coast district of N.S.W. This variety is dealt with in this book; it is essentially a dessert fruit and only grown commercially in a small way.

This tree grows better on the north coast on the undulating lands in close proximity to the sea than in situations a little farther inland, where autumn and winter temperatures which cause chilling and frosts are usually experienced yearly. Rainfall is more frequent and heavier near the coast, and this, together with less variation in temperatures and relatively higher humidities, is more conducive to fruit setting, development and maturation.

Broadly it may be stated that the custard apple does well under conditions similar to those where bananas are cultivated with success, but the Cherimoya can withstand lower temperatures than bananas after the fruit is harvested and before blossoming commences. It is advisable to plant this tree above the frost line.

Cultivation

Subsequent cultivation consists of deep ploughing during the winter or early spring while the trees are young, but as they grow and develop it is necessary to reduce the depth of cultivation, otherwise part of the root system will be destroyed.

FIGS

Conditions required for the dried fig industry are long, sunny days, high temperatures, and relatively low humidity. Though some of these conditions exist in parts of our semi-arid regions, adequate irrigation facilities are essential before a dried fig industry can be established, consequently no development of fig growing has taken place in such areas. In addition, frost hazards would require careful consideration, for though the fig tree is deciduous, young trees are susceptible to frost injury.

In Queensland, figs are found to be thriving on a comparatively wide range of soils, such as sands, sandy loams, and loams, all of which are regarded as suitable, provided they are well drained.

CLASSIFICATION

For horticultural purposes the fig may be divided into four general types—namely, Caprifig, Smyrna, White San Pedro, and the Common fig.

Caprifig: This is a primitive type of

the cultivated fig. Its useful purpose horticulturally is the part played by it as the host plant for the *Blastophaga* or fig wasp.

Smyrna: This type of fig includes those which require to be pollinated by an outside agency.

White San Pedro: This type combines the characteristics of both the *Smyrna* and the Common type on the one tree.

Common: The Common type does not require to be caprifiged. All the varieties grown in Queensland, of which Brown Turkey, Brunswick, Cape White, and White Adriatic are the best known, belong to this group. Hence growers in this State do not have to concern themselves with the problem of caprification.

PROPAGATION.—Fig trees are propagated from cuttings. The cuttings are made during the dormant period from well-matured wood of the previous season's growth. The long slender sappy growths which sometimes sprout from the ground should not be used.

CULTIVATION.—The cultivation programme for the fig orchard is similar to that for other deciduous fruit trees. It should be designed to maintain and improve soil fertility and moisture-holding capacity.

In the coastal districts light cultivation as often as is necessary to destroy weeds during the dry spring months is desirable. In the absence of bulky organic farmyard manure, maintenance and improvement of soil fertility may be achieved by growing and discing in green manure crops.

It should be remembered that, though fig trees develop large roots, they also have an extensive fibrous rooting system which is extremely sensitive to injury. These feeding roots do not penetrate the soil very deeply and, therefore, careful shallow cultivation must be aimed at.

GUAVAS

These fleshy, soft and seedy fruits originally were tropical, but they will grow almost anywhere. The smaller purple guava is also called the Strawberry or Cherry Guava, and grows to about 8 ft. as an ornamental shrub, thriving well in Victoria as well as in Queensland, where trees may be seen 10 ft. high. The large yellow guava thrives best from the north coast of New South Wales.

TROPICAL FRUITS

LOQUATS

A large evergreen with big leaves, this fruit tree is worth consideration, especially if one likes the sub-acid flavoured yellow fruit, somewhat like an olive in shape. Loquat seedlings take 10 years to bear, so it is wise to get trees which have been budded on to quinces. These bear much earlier, even in southern climes.

JUJUBE

This is a smallish fruit with a comparatively dry flesh, which compares with the date in food value owing to its high content of available carbohydrate. It has a distinct and pleasing flavour when used for pickles, preserves, as stewed fruit, or as a confection, but the raw fruit is not palatable. When dried it can be used in puddings, cakes or bread.

MANGO

This fruit is of a high nutritive value, being very rich in vitamins A and C, and having a fairly high sugar content, but it is lower in minerals than other tropical fruits. The pulp has a peach-like texture and is very juicy and aromatic. The mango loses aroma and colour very rapidly after cutting, and therefore must be eaten immediately. It can be cooked and used also for pies or marmalade.

After planting, young trees should be topped 24 to 30 in. from ground level, leaving either a whipstick or single fork formed by two laterals. The laterals, which should branch from the stem a few inches apart, are shortened 3 to 6 in., depending on their vigour. Shoots produced during the next growing season should be thinned out, so that the remaining ones selected to form the framework of the trees will be more suitable for their purpose.

Largely as a result of the difficulties met with in budding and grafting the mango under sub-tropical conditions, most of the trees planted in N.S.W. are seedlings, and, although occasionally a seedling tree will bear excellent fruit, the general experience is that the quality is inferior to that of the parent. The best mangoes possess a delicious flavour, have no fibres, and may be eaten with a spoon. Good varieties are *Alphonse*, *Bombay*, *Gulliver's Triumph*, *Peach*, *Strawberry*, *Apple*, and *Kensington*, or *Lott's Special*. Some excellent varieties undoubtedly originated as local hybrids.

The mango tree is an evergreen and is frequently planted for ornamental purposes, whilst its dense growing habit makes it specially suited for a permanent breakwind for orchards, etc.

Soil and Cultural Requirements

The mango is a native of Malaya. Under the tropical and semi-tropical conditions of N.S.W. it has proved extremely hardy. It grows well in almost any soil, though naturally it thrives best in good deep fertile loams.

Thirty feet apart is considered a reasonable distance at which to plant, but much depends on the nature of the soil. Grafted trees have a more spreading habit of growth than seedlings, and attain maturity at about the fifth year, whereas seedlings frequently do not bear until 10 or more years of age.

Propagation

Mangoes are easily grown from seed and strike very readily when the outer covering or husk is removed. Seed-beds or plant pots are usually used. The seeds should be covered with 1½ to 2 in. of soil and kept damp. In warm weather they will germinate in from two to three weeks. The seeds of many varieties are poly-embryonic; i.e., a number of plants will grow from one seed. In such cases all but the strongest should be suppressed. Seedlings do not bear fruit true to type, so that when it is desired to reproduce a particular variety, budding, grafting or inarching must be resorted to.

For budding, the plants are set out in nursery rows and when of sufficiently large size — say, of one inch diameter — they are plate budded. Waxed cloth should be used to tie the buds in position. The time for budding is when the stocks are in vigorous growth, though the budwood, which is best selected after it has lost most of its leaves and is turning grey or brown in colour, should be taken preferably whilst growth is dormant.

PASSION FRUIT (see p. 223)

PAWPAW

The pawpaw is a fruit of a very high nutritive value; it is very rich in carotene and vitamin C, being as rich as apricots in the former and richer than oranges in the latter.

VARIETIES

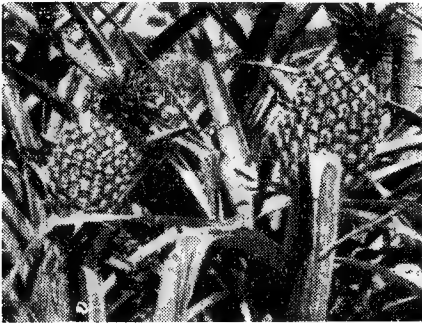
Soil

Several types of soil are planted to pineapples in N.S.W., ranging from rich, dark brown volcanic scrub loams to poor, sandy heath country. Although successful plantations are found on many classes of soils, the most essential feature of suitable pineapple soils is good natural drainage. Stagnant water is very injurious to pineapple plants, and during periods of excessive rainfall the soil must not become sodden or sour.

A high humus content is also necessary, and cultural methods that will maintain the organic matter of the soil should be practised. Although the pineapple is a shallow-rooted plant, it is advisable to dig the land as deeply as practicable according to the nature of the soil.

PINEAPPLE

When ripe — i.e., when the smooth surface of the skin is yellowish in colour and the leaves at the tip pull out easily — the common smooth leaf variety of pineapple contains about 10 to 15 per cent. of sugar and is a fairly good source of vitamins A, B and C, but is not as rich in A and C as are most other tropical fruits. The common variety in Australia is the *Smooth Leaf Cayenne*.



Climate

The commercial areas which make up the small acreage of pineapples in N.S.W. are dotted throughout the coastal strip from Tweed Heads to Port Macquarie, with a sea frontage of approximately 250 miles.

Results obtained over a long period of years from these plantations are sufficient proof that the climate and selected soils in this tract of country are suitable for

pineapple-growing, provided certain precautions are observed.

A well-distributed, moderate rainfall is preferable to a heavy annual precipitation — especially if of irregular occurrence — and any deficiency in this regard can be improved by good cultural methods and the use of paper mulch. Excessive rainfall contributes to the production of soft, watery fruit which lacks flavour and does not carry well. It also accentuates drainage problems.

Planting

As the pineapple is a surface rooter, it should be planted shallow. Suckers should be set about 3 or 4 in. deep, according to size, and slips or tops not quite so deep. Experience has proved that pineapple plants, as individuals, do better when planted close together. As the pineapple is shallow-rooted, it is necessary to keep the surface layer of the soil cool and moist.

POMEGRANATE (*Punica granatum*)

This rosy-red fruit has single red flowers, but a garden variety has double red flowers. It grows to about 10 ft. in height in a warm position. The dwarf pomegranate (*nana*), 2 ft. high, with single or double flowers, is used as a rockery plant; its fruits, though small for pomegranates, are large for the size of the plant.

PERSIMMON

The value of the Japanese persimmon is not sufficiently appreciated. It is very palatable when fully ripe, and has a relatively high energy value. (See previous section.)

ROZELLA or ROSELLE

Rozella is a Hibiscus species which is commonly grown in Queensland, and remarkable because so many parts of the plant are usable. The flowers, seed pods and young stems can all be used for jams and jellies, and the flowers also for pies and tarts.



Monstera deliciosa



Nut Trees in the Home Garden

by REV. D. RETTICK

THE nut-bearing tree should be given a place in every home garden, as a source of giving pleasure and supplying a real need. The food value of nuts is known to all, and whether it be the nut-bowl on the table, or its delicate flavour in cakes, this article of diet is invaluable.

Almonds

What nuts should we grow? I think that the almond would meet the needs of the home grower best. It is easy to grow, providing it is planted in well-drained soil. Very few trees like wet feet, and the almond will "gum-up" and rot away, usually when it has come into bearing in about the third or fourth year.

An almond planted in a warm, dry corner of the garden will flourish with little or no attention in pruning or cultivation, and will be liberal in its return of regular nut crops. It serves as a useful ornamental tree, being one of the earliest trees to burst into bloom in springtime.

There are several varieties. The "Paper Shell," though not suitable for commercial purposes because of its soft shell, has a plump kernel, and the shell can be easily broken with fingers when sampling the new season's crop on the tree, or without the need of crackers on the table. Jordan and

I.X.L. are two of the good varieties, but the hard-shelled variety, used commercially for making almond essence, is not suitable for the home garden.

Walnuts

The Wilson's Wonder walnut flourishes in rich deep soil and does not mind a little extra moisture, as it is a nut which grows best in a temperate climate. The feature which distinguishes this variety from other kinds of walnut is that it will bear nuts in the first season, whereas other varieties take seven to ten years before the tree comes into bearing. This walnut is about twice to three times the size of the ordinary walnut and has also a rugged exterior, which tends to make it unpopular commercially, but the full, richly-flavoured kernel is delicious.

All home gardeners like a quick return for their labours, and there is much pleasure derived from watching the nuts appear and



The Australian Bush Nut is a favourite the world over.

mature within twelve months of planting. I think that this comparatively new variety of walnut will become popular with home gardeners; unfortunately, stocks are in short supply.

Pecans

The pecan nut from America is an excellent nut to grow in the warmer climate. Avenues of this nut tree in the sub-tropical climate of Grafton, New South Wales, show what a splendid street tree it makes, as well as bearing heavy crops of nuts. This nut has a thin shell, and in shape is like a slim walnut; the kernel and flavour resemble the walnut also. The tree grows well in the temperate climate, but it does not bear satisfactorily.

Other Nuts for Your Garden

Then there are the Filbert, Hazel Nut or Barcelona Nut, with its shrub-like growth, which flourishes best in the volcanic mountain country, although it grows well in rich soil in the temperate lowlands. Two varieties are usually grown together — the white and the red — for pollinating purposes. The delicate flavour of this nut makes it a favourite for table and cake use.

We cannot leave the homely Peanut or Ground Nut out of our list. Though it is more sub-tropical in its choice of climate, yet it will grow in warm dry places in the home garden. It gives much pleasure to watch the potato-like plant growing, especially when it sends down its aerial roots from the stalks. These roots, which are sometimes twelve inches long when reaching the ground, develop a nut-like formation

just below the surface of the soil, and so develop into the mature peanut.

The whole plant is pulled up when the foliage yellows, and the nuts are then picked off. It will be understood that the peanuts which are sold in the shops are not suitable for planting, being roasted; therefore the green or unroasted nut must be procured for planting. Springtime, when clear from frosts, is the best time for planting the peanut, and, of course, the dormant season of winter is the time to plant the nut trees in the same way as other deciduous trees are planted.

The Australian Nut

Formerly known as the Bush Nut, Popple Nut, Bauple Nut, or Queensland Nut, the Australian Nut is known botanically as the *Macadamia ternifolia*. The name was given to this native tree by Baron von Mueller when exploring the rain forests of the north coast of New South Wales in 1886. It has since been learned that only in that narrow territory between the Hunter River and the Queensland border is this nut found, chiefly about the Tweed River, and nowhere else in the world.

Plantations of up to 100 acres have proved this nut to be a profitable enterprise. The tree will grow to a height of 30 ft., and when spaced well apart grows into a beautifully shaped tree. It is an evergreen, with crisp, glossy, serrated leaves about three inches long. The flowers form in clusters and grow into nuts which resemble an open bunch of grapes, in size from half an inch to over an inch in diameter. The nut is enclosed by a green hull, which opens down

NUT TREES IN THE HOME GARDEN

the centre. From the hull one of the finest tanning essences can be procured. The shell, which is of a rich brown colour, is very hard, and perhaps is the main reason for this nut's unpopularity commercially. Trinkets and buttons of very ornamental appearance can be made from the shell, as the interior of the nut is a beautiful two-tone colour. The shell contains 3% oil, while pigments and carbon rods can be made from the burnt shells. The kernel has no brown skin on it, but is a creamy white and contains the highest food value of any article of diet, while the oil content is the richest of any nut, being 78%. This oil is now being used as one of the most successful foods in the treatment of premature babies. The nut, when roasted and ground, makes the most delicious butter, much richer than peanut butter. A leading dietitian in Melbourne said he would take tons of it if it were procurable. It outrivals any nut for garnishing cakes.

It may be asked why, then, has this nut not found a more ready sale. It can be said, in the first place, we think the shell is too hard to crack, and in the second place, it has only been in recent years that the nut

tree has been cultivated. It is here that we Australians have to make a sad admission. Where we lacked in appreciation and enterprise, the Americans showed enthusiasm, brushing aside the hard shell idea by saying, "We don't worry about the shell; we are concerned with what there is inside." So about thirty years ago they bought all the nuts that were available and since have planted thousands of acres in California and Tahiti. Through hybridising and selection they have produced a thinner-shelled nut and a larger one. It is now their No. 1 nut for confectionery, they having discarded their pecan nut for this and having called it the California Nut.

The tree will bear fruit from four to seven years, and at twelve years will give a good crop. At twenty years the trees will bear about 300 lb. of nuts per tree, and the yield per acre about 3 tons. It has been estimated that the tree will bear for 100 years. While the natural habitat of the Australian Nut is in the sub-tropical rain forests of north-eastern New South Wales, the tree will grow readily in the temperate climate. A fine sample is to be seen in the Botanic Gardens, Melbourne, and in the Burnley Horticultural Gardens. Both trees are bearing nuts. Planted in a warm aspect, they should give pleasure and satisfaction.

Peanuts

The peanut has the peculiarity of forming its seed—the nuts—beneath the soil surface. The yellow flowers are borne at the leaf axils, in the bush varieties at the base of the stems, and in the runner varieties along the stems. After pollination the flower falls, leaving the stalk with a thickened end or "peg," which grows down into the soil, where it matures into a seed or nut. It is obvious that penetration of the soil by the pegs is essential and that soils of a light nature and loose surface are very desirable from this point of view.

The peanut will not stand frost, being susceptible at all stages of growth, and ample sunshine, moderately high and consistent temperatures, and a well-distributed but not excessive rainfall provide conditions suitable for its growth. A somewhat dry autumn is necessary to enable the crop to be harvested and cured without damage to the nuts, and, generally speaking, it will be found that peanuts will do well in districts suited to the late varieties of maize. They will grow on a large variety of soils,



Peanut plant, showing the nuts, which are produced underground.

PLANTING PROCEDURE

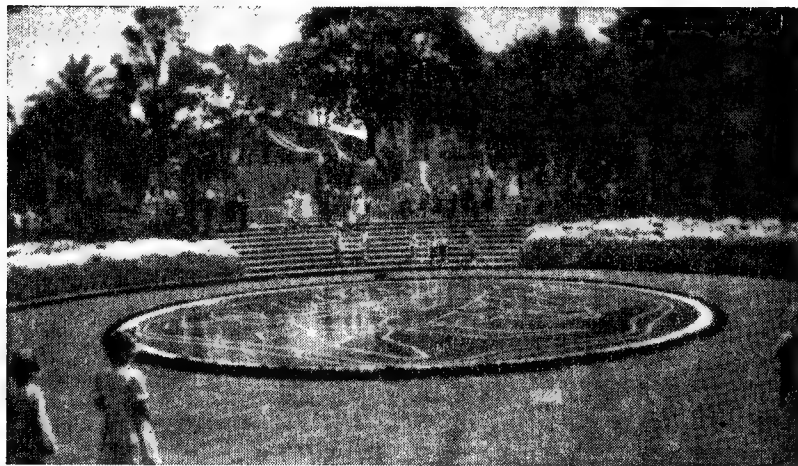
ranging from light sandy loams to medium heavy clays, but a fertile, well-drained, light sandy loam with a good humus content is to be preferred. Heavier soils retard freedom of "pegging," and are inclined to produce a large bulk of top growth at the expense of nut development. Nuts from coloured soils are always stained, and this detracts from their market value, although the feeding value is in no way reduced.

PLANTING: It is inadvisable to grow peanuts for more than two successive plantings on any land; for good results they should be grown in rotation with other crops. Early ploughing is essential, so that moisture may be conserved, and a fine friable seed-bed, free from decaying crop residues, weeds and large clods, may be obtained. Weed growth considerably reduces yields.

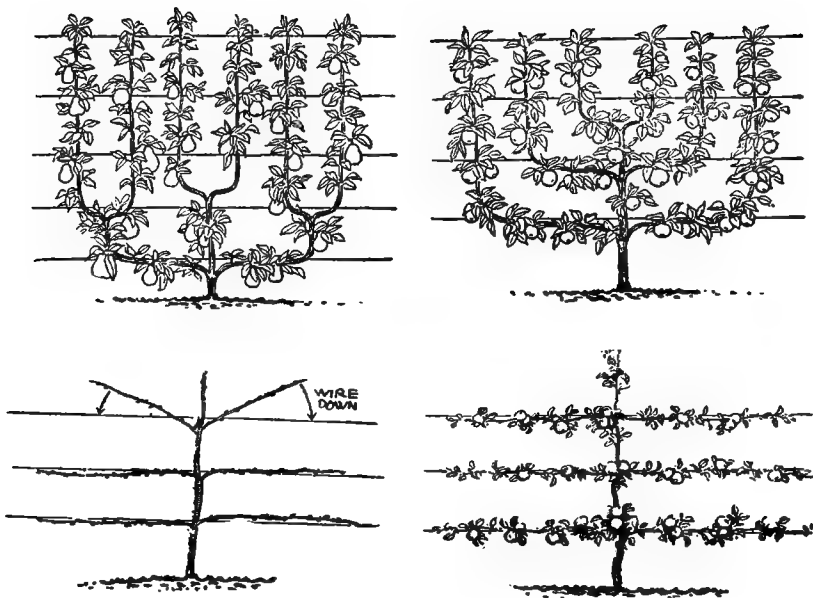
For planting, unshelled raw nuts, nuts broken in half, or shelled nuts (kernels)

may be used. To ensure a uniform planting of only well-developed kernels and a quick germination it is advisable to use shelled nuts.

VARIETIES: Peanut varieties may be divided into two groups, namely, runner and bush types. The runner type rarely exceeds 9 in. in height, and under favourable conditions may spread to a distance of 5 ft. In most cases they are late maturing and good yielders of both nuts and forage. The bush types grow from 12 to 30 in. high, with a spread of about the same distance. They are easier to harvest and thresh, and, as a general rule, yield better on the heavier types of soil or under unfavourable conditions than the runner types. The runner type varieties are longer maturing than the bush types, the former taking approximately five months and the latter four months.



Distinctive landscaping can be done with borders as shown here in Sydney's Hyde Park, the King George V Memorial Garden.



Three types of espalier pruning which could also combine grafting of different varieties. Top left is candelabra style. Top right: U-form. Below is cordon method.

Espalier. . . an orchard in your backyard

by ALAN EDMUNDS

[Mr. Edmunds is an authority on the trained fruit tree known for centuries in Europe as the the Espalier. His book, *Espalier Fruit Trees—Their History and Culture*, has been described by the Melbourne Botanical Gardens Director (Mr. Jessep) as “a horticultural pot-pourri of science, humour, and practical hints,” and it bids fair to join the classics of horticultural literature.]

YOU can have an orchard, an enchanting orchard, within the narrow confines of your own backyard if you so hanker. And I don’t mean an ordinary orchard consisting of one type of fruit, such as all pears or all apples. That would be too tame, too monotonous.

I mean an exciting orchard, a super-doooper mouth-waterer containing 14 different pears, all different shapes and flavours; 12 assorted apples—green ones, red ones, yellow ones, and cookers; six different plums—juicy English and fruity Japs; two nectarines, a few peaches, and an apricot, all most delectable.

Yes, believe it or not, all these may be packed neatly into your backyard, be it only

40 ft. x 40 ft., and still have room left over for some rhubarb, silver beet, a few cloves of garlic and “those roots of ’orse radish that dear Mrs. Higgabottom gave us!”

You can build yourself this orchard over which I enthuse by means of a horticultural trick that frog-eating French fruitarians have been playing for centuries. The trick has been called “espalierising the fruit tree” and turning a fruit tree, the poor shrinking

DESIGN AND TREATMENT

amorphous thing you buy in the shop, into an espalier of classical proportions and symmetrical beauty is almost as easy as turning a cow into a paddock.

First buy your trees — any ordinary pear, apple, plum, or what-have-you — then train them to the shape you want them, or the shape that will fit your fence or trellis or garage wall, and then, when they are well-rooted and growing nicely, start building your orchard on to them by grafting in all the other varieties (of the same family, of course) that you can beg, borrow, buy, or bot.

This stunt is becoming very popular in Australia now that suburban gardeners have discovered that there is no mystery about a deciduous fruit-machine. Its habits are now well-known. It invariably stays where you plant it, even if there be a peach in the next bed. It submits meekly to physical culture, and will permit you to train it to any one of a dozen different handsome, graceful designs.

Many Fruits Off One Tree

June or July is the time — when they are all asleep — to plant a few trees. They are absurdly easy to train, really. As they have no means of locomotion, however, you must build an inexpensive framework or trellis for them to lean up against, and to enable you to train their arms or branches into a beautiful design that will be the envy of your friends and the despair of your less enterprising neighbours.

The number of designs to which you could train a pear, plum or apple tree runs to dozens — branches going horizontal a foot apart from a central trunk; branches going criss-cross with no central trunk at all save for the main trunk from the ground to the lowest branches; or candelabra-like formations; or up in the air overhead like the ribs of an umbrella; or over a garden walk, pergola-fashion.

The principles and practices that must be followed in all this training are based, naturally, on natural laws, and you cannot break them with impunity. For example, you cannot make a branch of a fruit tree grow upside down like the limb of a banyan. Nor can you cause a branch to grow in a horizontal direction unless it belongs to a weeping sort like Eliza Rapke.

Bend to Design

The horizontal position of branches which is such a characteristic of many espalier

designs is achieved by first growing the branch in a vertical position until it has attained a desired length and THEN bending it down gradually into its permanent horizontal position.

A word of warning here: Do not bend young branches down from the natural vertical posture to the horizontal too soon or too brusquely, or you will in all probability carry the twig in to your wife and, in a voice tinged with sadness, mortification and self-accusation, say, "Look! See what I 'ave been (sob) and gone (sob) and done."

Be admonished, therefore, in the days of your apprenticeship and bend young branches down gently with gradualness, or as the French say, with appropriate gesture, "*avec beaucoup de delicatesses*," and the plastic tissues of the tree will adjust themselves to your friendly pressure without fracture. When finally in a horizontal position the woody centre of the branch will become firm and gradually increase in strength, and it will then remain in that position throughout the life of the tree.

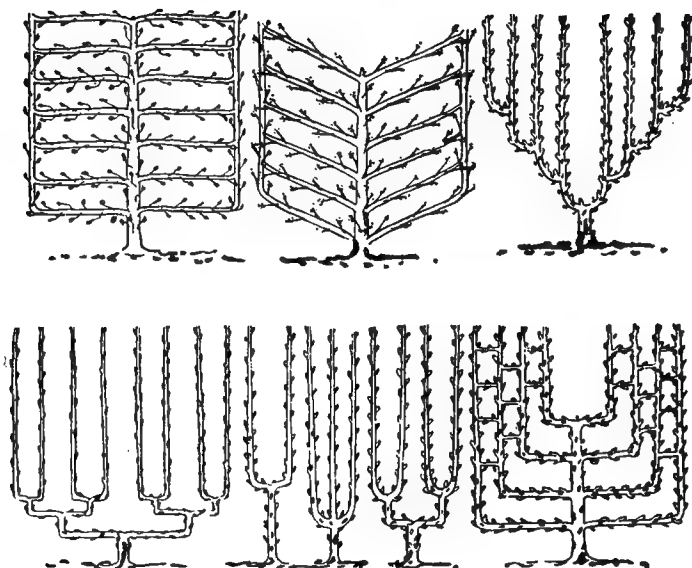
The reason for this horizontalisation of the branches is that the sap flow is slowed up and spends more time with each bud and tends to turn more of them into fruit buds than if they were left in a vertical position. When a branch is in a vertical position the sap rushes up to the top and causes it to grow much faster than a branch in an inclined position. When, however, the branch is bent over sideways the sap merely dawdles along like a reluctant dragon pregnant with Chinamen staggering up Lilly Boulke Sleet.

And THAT is a good thing. The slower the sap movement the greater the fructivity, and the greater the fructivication the better the fruit salad. . . . I refrain from all mention of clotted cream — but there was such a thing — once!

From this we learn that vertical wood-shoots are to be frowned upon, and if that doesn't work then they must be suppressed. You may allow them to grow not more than a foot vertically, then pinch the top right off. When the base of the shoot thickens to something approaching the diameter of a lead pencil you take the secateurs in hand and cut the non-co-operating shoot off about half-an-inch from the horizontal mother-branch, leaving one or two buds only. That goes for pears, most apples, and plums.

These base buds generally produce a fruit bud sooner or later, and as the production

ESPALIER



These plans illustrate the possibilities of espalier work. Plan for your space. A Delicious apple when 14 years old will cover a trellis 22 ft. wide and 7 ft. high.

of fruit buds and the elimination of useless, glutinous wood-shoots is the prime purpose behind all your training, the removal of vertical wood-shoots is next in importance to the horizontalisation of the main, or mother-branches.

This cutting off of vertical wood-shoots applies only to pears, apples and Jap. plums, which bear their fruits on short spurs, and does not, of course, apply to peaches or nectarines, which fruit on wood-shoots that grew, say, a foot or 18 inches long last year.

All branch training must be done with white tape or strong string, and the branches should be tied securely (with a bow to finish off the knot so it can be undone very easily) to your design-framework, which, of course, must be put up first before you start. Be careful not to tie the branches in such a manner that they will be garrotted by the string as they increase in circumference. Anyhow, if you are keen you will look at them frequently and notice the string getting tighter, and so use the bow and loosen up the tie.

Espalier Fruit Salad

When your young espalier is two or three years old you begin to think about

building the orchard by grafting in all the other varieties you would like to see there. To whet your appetite, let me expatiate for a few lines. If you should plant an apple which might be, say, a Delicious, you could make the next tier above the Delicious base-branch a row of yellow Five Crowns; then you graft on a row of Red Statesman, and again a tier of golden Delicious, to be followed by Staymen's Winesap, or any other nice rosy-cheeked apple.

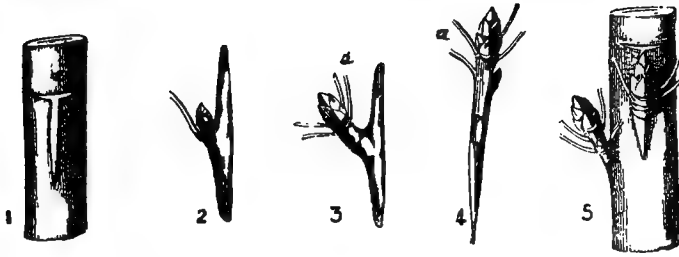
Such an entertaining horticultural exhibition would call forth from your week-end visitors exclamations of pleasure at the sight, to say nothing of the "O, aren't you wonderful!" from the ladies. They would certainly be tickled with the idea of Cleopatra cooling off with Pomme de Neige, if you know what I mean.

Art of Graft

To graft successfully you observe the following simple rules:—

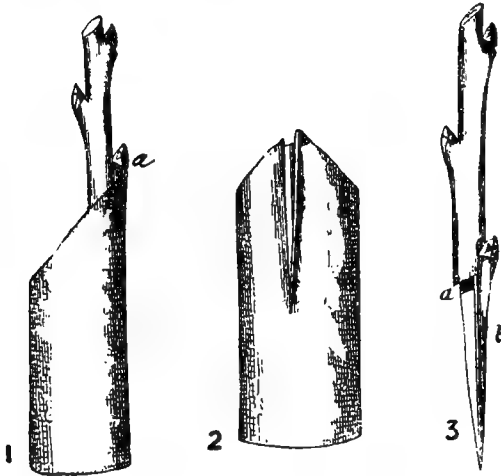
1. Graft your scions (pronounced sigh-ons) on to the same varieties and keep to the same families. For example, the pyrus family includes all pears and apples; the prunus, all kinds of plums.

GRAFTING



THE GIRARD METHOD OF GRAFTING

TOP: 1. — The "T" shape incision. 2.—A wood bud ready to slide into the "T." 3.—A fruit bud ready for insertion. 4.—A terminal fruit bud sharpened to chisel point. 5.—The fruit bud and the terminal fruit bud in position. You now bind with raffia and wax.



AT LEFT: Method of turning glutinous wood-shoots into fruit-producing outlets by cutting back and grafting in two or three bud twiglets or terminal fruit buds. 1.—Buds inserted. 2.—The bark cut and opened. 3.—The scion cut and ready to insert in 2.

- Therefore pyrus to pyrus and prunus to prunus is O.K.
2. Graft the scions at the correct time, namely, just before they blossom in the early spring. If you leave your grafting till later the scion will dry out before it has time to grow on to your stock, i.e., the tree you are trying to make it grow on.
- [Note: A scion is a single bud, or a fruit-twig a few inches long, or a branch several feet in length that you wish to graft back on to the same tree from which you cut it off or on to a tree other than that from which you have cut it.]
3. Graft only scions in perfect condition—that is, plump, healthy, juicy-looking ones. If they are spindly, narrow-gutted and hungry-looking, they never do any good. They become dehydrated before they can take and draw on the stock's sap supply.

4. Cut your scion and stock correctly. The scion must be precisely the same diameter as the stock. You split the stock down the centre, say, one inch; you then slice the scion on each side of its base end like a chisel, also one inch; you then push the chisel into the split firmly, bind with string and cover all over with grafting wax to keep out air, rain and insects, and the job's almost done.

If you have chosen scions of the same diameter as that of the stock you will bring the cambium (the living tissue) of both in close contact. It is the cambium layers of each that grow together and make such operations possible. The cambium is the layer of living, growth-producing cells that completely surround the tree between the bark and the wood. They produce the tree-rings each year and they also enable you to build an orchard in your backyard.



PRUNING is a means of controlling the growth of a plant so that it uses its energy of growth efficiently to produce the best possible fruit, blossom and foliage. A wasteful plant becomes a weak plant, and much more susceptible to attack by insects and diseases. Wise pruning can extend a plant's life beyond its normal span.

The art of success lies in knowing how to:

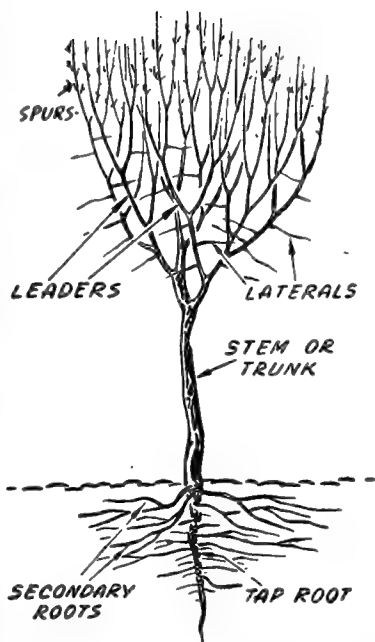
1. *Cut back*, at the correct time, the useful branches and shoots. This conserves the sap supply and promotes new and productive shoots for a future season.
2. *Regulate and distribute* the main branches, so as to obtain structural balance, accessibility and openness to the sun.
3. *Remove* all dead, injured, misplaced and weak growth which gradually starves the rest of the plant. Diseased limbs may eventually destroy the heart wood and weaken the trunk.

Some Guiding Principles

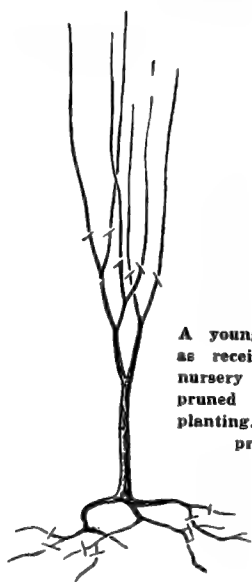
1. The stimulating effect of pruning is only temporary; it ceases when the balance between the roots and the top has been restored. Plants rebel against unwise pruning. Thus heavy branch pruning forces the latent buds to produce more wood and leaves, instead of fruit. Heavy root pruning reduces wood production and forces fruiting.
2. Don't prune a vigorous plant severely if it is 'shaping and fruiting well. Reserve severe pruning to reinvigorate weak plants.
3. The more vigorous growth occurs on limbs which approach the vertical; sap flows more readily to the highest point. Prune with a view to forming strong leader growth at the top of each main limb.
4. Prune regularly, after each new season's growth.
5. Distribute the pruning evenly over the entire plant to maintain an even renewal of growth.



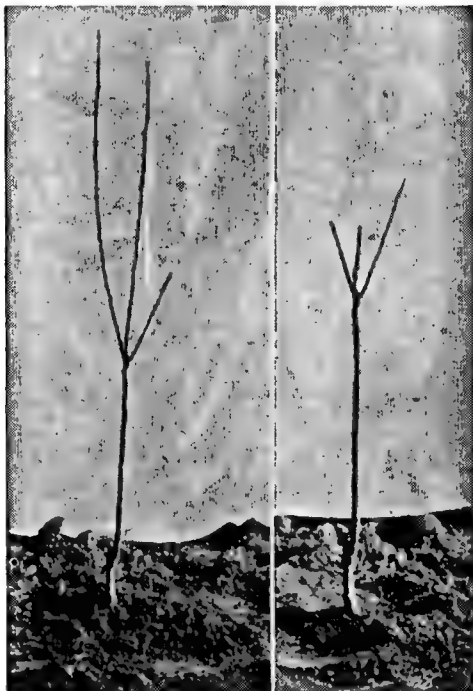
Above: A three-limbed tree before and after pruning. At right: A three-limbed tree with two strong shoots cut back and a weak one left unstopped.



Some terms used in pruning.



A young fruit tree as received from a nursery should be pruned ready for planting. Note root pruning.



PRUNING

Practical Points

TOOLS: Budding knife, secateurs, saw, pruning shears.

CUTTING: (1) *Secateurs* are the most useful tool. The blades must be very sharp. The cuts must be clean, so that the wound can heal quickly. This is important. Cut above the bud. Place the cutting blade against the bud so that it just touches the tip of the bud. If there is wood left above the bud it will die back and may kill the bud. The angle of cut is about 45° .

(2) Cut to a bud pointing in the direction of new growth.

(3) Cut off side branches as close as possible to the main branch. Don't leave stumps. They decay, and decay may continue back into the main limb and kill it.

(4) Paint large wounds with shellac, zinc oxide and linseed oil, or coal tar, to prevent the entry of virus and fungus.

(4) Study your plant before cutting. You can't replace cut-off wood.



The Wrong Way to Prune: The owner of this shrub tried to get new growth by hacking it off. Stumps are decaying and the bush is an eyesore. New growth can be forced with many shrubs by cutting back to the ground, but not 6 in. above it.

Pruning Young Deciduous Fruits

When pruning the young fruit tree, the most important object is to lay the basis for a strong adult frame. Mistakes made at this stage may be very difficult to correct later. The shape of the mature frame depends on the natural habit of the tree, the climate, and its rate of growth.

In colder climates the open inverted cone is most useful because it admits light and sun to the centre, facilitating harvesting, spraying, ripening and reduction of fungus disease. In warm climates a closed frame may be desirable to protect the wood and fruits from sun-scorch.

Encourage an upright growth in spreading varieties and a horizontal growth in upright types.

Nurseries supply young trees in the form of one-year-old straight "rods" and older headed-back trees with two to five shoots. Rods are about 2 ft. long. When shoots arise from the buds, select about five well-placed ones and remove the others. In the next two years pick out three for the frame; the extra ones are kept in case of damage.

Of the branched young trees the ideal is to have the shoots spaced evenly, and evenly grown. Cut back each shoot to about 8 in. above the crotch. Cut to suitably placed *side buds* so as to double the number of leaders next year.

It is pointless to double the number of leaders if the shoots are very closely spaced. The simplest way is to spread the limbs mechanically until they take on the desired frame.

If the shoots are unevenly developed, leave the weak shoots and shorten the stronger ones.

Avoid forming a frame with two shoots because a "Y" crotch often breaks under the strain of heavy crops.

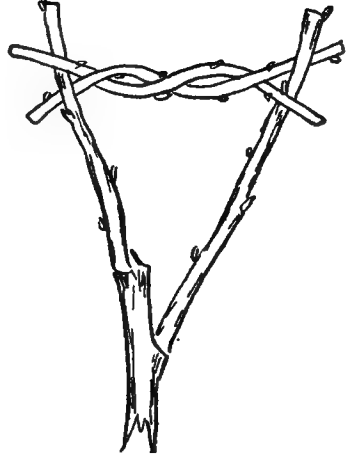
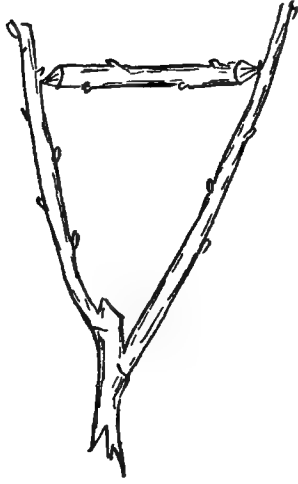
The limbs of the future frame are decided upon when the tree is two years old. Cut wisely and carefully. Allow a reasonable length of shoot to remain—up to a half. Hard pruning tends to set the limbs too closely.

By the third winter from eight to 12 main limbs will have been established. Carefully select these, according to variety, and cut away the others. Cut back about two-thirds of their length, and cut to *outside buds*, so as to direct the growth in the most favourable direction.

PRUNING



At left: The buds marked X should be removed to enable those marked with arrows to provide well-spaced shoots.



Above: Two methods of spreading shoots which may be growing too close together.

When to Prune

Deciduous fruits are pruned as described here in the dormant winter period after leaf fall. Evergreen fruits (e.g., citrus) are pruned during the first stage of active growth in early spring.

Deciduous Shrubs

First examine the shrub to find out whether the flowers form on wood grown in the same year or on wood from previous seasons. There are three main classes:—

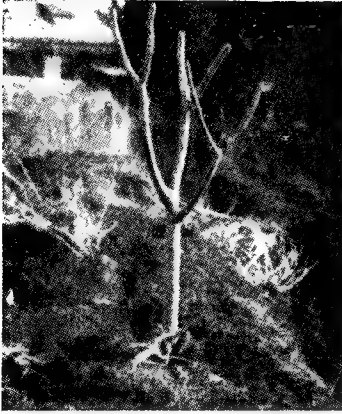
- (1) Those which bloom (usually in summer and autumn) on shoots formed in the same year of blooming. Prune these after flowering in the autumn. Cut the previous year's wood back hard close to the old wood. If old wood is removed, leave enough to carry new growth. Thin out weak shoots to allow the remainder to develop well.

See also Keith Winsor's

AUSTRALIAN PRUNING MANUAL

130 pages, fully illustrated, price 7/6, from Motor Manual.

PRUNING



Shaping the Tree: An apple in the second year, showing development of main leaders.

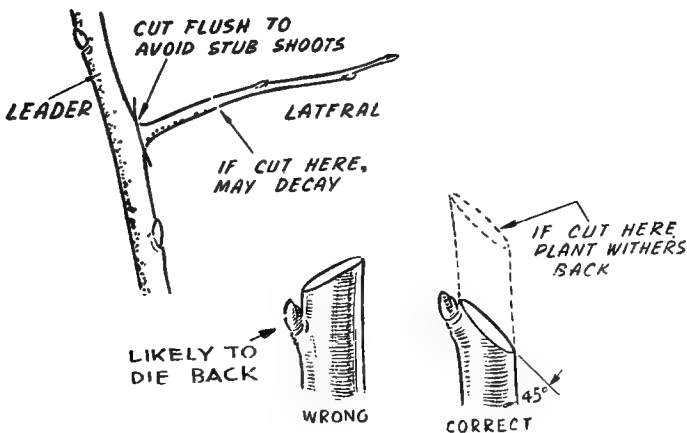
- (2) Those which bloom (usually in late winter and spring) on wood formed in the previous spring or summer. Prune after flowering to enable wood to form for next winter and spring. Merely thin old flower shoot and tidy and trim the shrub. Do not cut hard unless you wish to miss a year's blooms in order to rejuvenate the shrub.
- (3) Those which bloom (usually summer onwards) on wood formed in the previous season. In many cases new wood begins to form during the blooming season itself. Cut away immediately after flowering to enable this new wood a full season to develop. So much new growth may occur in the summer blooming season, that thinning out then may be necessary.

Evergreen Shrubs and Conifers

Evergreen require little pruning. Thin out and remove misplaced shoots and limbs. Spring is the best period. Conifers are rarely pruned. Remove dead limbs in autumn. Native shrubs respond readily to pruning each season.

Evergreen Vines

Prune to prevent dense growth just before the growing season. If flowers form on the current year's new growth, cut in spring; if flowers form on older wood, cut after flowering. Young shoots of wistaria can be cut back to within a few inches of their bases to induce blooming. In winter these same shoots can be cut again to six inches after flowering.



PRUNING VARIOUS FRUITS . . .

APRICOTS

The ideal tree is one with a short, stout trunk, about 15 in. high, with the main arms pointing away obliquely and the secondary arms in the same direction. The mature wood is brittle and each main limb should be firmly founded on the trunk.

Apricots fruit on short spurs on new and old wood. The spurs are not permanent and last only a few seasons. New wood must be constantly renewed.

There are three types of bud: wood buds at the base of the laterals, single fruit buds at the tips, and "multiple" buds and wood buds along the main parts. Cuts are made to the "multiple" buds.

Remove vigorous lateral growth at the head of the tree entirely in order to promote laterals in the heart and lower parts.

Thin out new laterals in the heart, retaining sufficient to supplement the existing spurs. Leave short laterals up to 12 in.

untouched; shorten larger ones with "multiple" buds by a third. This will throw the lower buds into fruiting spurs and induce new laterals for the next year.

Shorten ageing laterals progressively.

APPLES



Apple: Suggested treatment — Fruiting laterals shortened back at A and D to promote new growth. Weak laterals tipped at B and C develop fruit buds. Weak laterals of preceding year, showing bud development; these are stopped at E and F. Strong laterals retained and shortened back at G. Secondary growth removed at H (Jonathan).



Spur Thinning: An extreme case of neglect. Over 200 fruit buds were counted on the section of the limb shown. When thinned out, this limb should show only about 20 spurs, each with only three or four buds.

PRUNING

APPLE TREES

Mature trees require up to 12 limbs to provide plenty of fruiting wood.

The fruit is borne on spurs which stand out at an angle from the wood. Several flowers may form from a single bud, forming a cluster of fruit.

Some varieties bear the spurs directly on the main limbs and older laterals. These spurs are stocky and more densely spaced. Such varieties are called "spur bearing" types: Gravenstein, Delicious, Granny Smith, Statesman.

The laterals which form on them are not so important and can be cut back more severely, up to the fourth bud, according to age, vigour and length of the lateral. Shortening too severely causes new laterals instead of spurs and fruit.

Other varieties — Jonathan, Cox's Pippin — bear spurs chiefly on younger laterals; these spurs are more slender and more widely spaced. As the laterals age the spurs on them lose vigour and the fruit becomes smaller and of poorer quality. To offset this, cut the laterals back progressively each year to the main leader, each cutting serving to reinvigorate the remaining spurs. Eventually cut the lateral away altogether.

When pruning leaders, examine to see whether last year's leaders have produced any quantity of new spurs and laterals. Cut back if growth be poor, but allow the lateral to continue if growth has been vigorous. Sometimes the spur and lateral growth may have been excessive and the lateral may have extended little; if so, thin out the spurs and laterals.

The leaders of old trees, say 12 years

and older, frequently break under the weight of crops. Occasionally shorten back these leaders to a healthy lateral. Choose the lateral so that it can continue as far as possible in the line of the leader, so that the sap will flow upward.

In nearly all varieties the spurs tend to become congested. Thin such ones out, retaining two strong fruit buds. Spurs will not regenerate if broken off or removed.

PRUNING CHERRIES

Prune the cherry as for other fruits, building up to 12 main limbs.

There are two groups — the sour varieties with a drooping habit, and the sweet varieties with an upright habit. The sour varieties generally have to be cut to *inside* buds when pruning to induce an upright growth.

Fruit is borne on spurs of wood one and more years old. The spurs are long-lived.

Prune sparingly, merely thinning out the laterals and removing misplaced growth. Larger laterals may be shortened.

Do not stop the leaders of mature trees as in other fruits. This may be done only

if the crop has noticeably deteriorated or become inaccessible.

Cherries are prone to gumming, and the limbs die out. Prune when this danger is least, i.e., after the crop and before winter. The wounds can heal while growth still remains.

PEACHES AND NECTARINES

Usually up to nine arms are designed and good crops are obtained if these are kept furnished with plenty of new laterals.

These produce fruits only on wood formed in the previous season, i.e., on one-year-old laterals. The aim must be to keep renewing one-year-old growth for the next crop. Moreover, as a result of this kind of growth the peach tends to produce fruit more and more at the ends of branches and the centre of the tree tends to become more and more barren, unless the pruning can offset this.

There are three types of buds — leaf buds, flower buds, and triple buds, consisting of two flower buds with a growth bud between them. Always cut to a triple bud.

POINTS TO REMEMBER

There are several types of wood to deal with. Firstly, the one-year-old lateral. On vigorous trees there are usually more produced than required. Thin them out by cutting some back to a couple of buds at the base. These will throw out new fruiting wood in two years' time.

Some varieties produce fruit only at the tips of the laterals. Do not shorten these.

Leave desirable new laterals untouched.

Secondly, the two-year-old laterals. Cut them back to a vigorous shoot. Just how

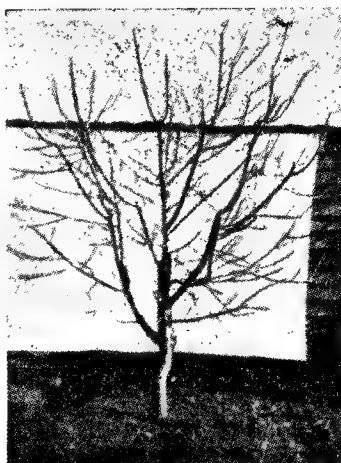
far back depends on whether the new shoots are distributed evenly along its length or at its extremities; cut more severely if the distribution be more even.

Thirdly: In old trees with a large amount of old unproductive wood, cut back the leaders to a more vigorous lateral and remove old laterals.

When the two-year-old wood has no growth—buds, spurs or shoots—remove it altogether, cutting off carefully flush with the main branch.



Before: A young peach tree in need of pruning.



After: The same tree after a successful pruning.

PEAR TREES

Adult pears need up to 12 main arms.

The fruit is borne in the same way as apples. Most varieties bear on laterals like the "lateral" apples. The others bear on short spurs which develop on the main limbs.

The most important wood is the laterals. In the lateral types the new laterals are left uncut for up to three or four years before cutting back, and only thinned out when misplaced or too crowded. This enables the terminal bud to fruit and the wood bud behind it to become productive fruit buds.

There are three types of buds—a small round leaf bud, a rounded well developed fruit bud, and the important "dart" bud, which is a leaf bud in the process of transforming into a fruit bud. Never cut to a "dart" or it will fail to transform and will become a woody shoot.

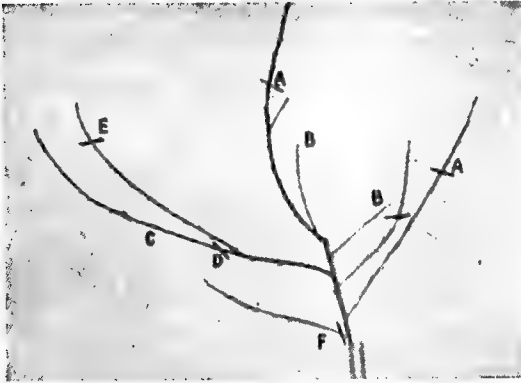
Shorten back the older laterals as in

apples to induce new laterals and spurs; otherwise they become unproductive and straggling.

Some varieties, e.g., Williams, crowd their spurs, and the crop deteriorates. Thin out such spurs.

If the tree is vigorous, leave the leaders uncut, or treat very lightly.

PRUNING

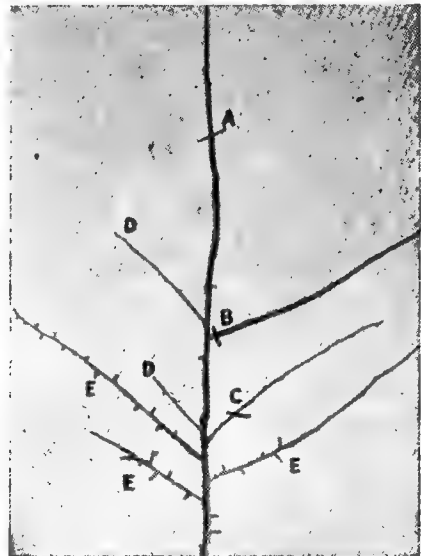


PEACH: Suggested treatment—Strong fruiting wood shortened at A to stimulate setting of fruit and development of new wood for ensuing year. B: Weak laterals left unshortened. The lateral on the left was shortened at C the preceding year; it has borne fruit and forced out new wood; the old or weak wood is removed at D, retaining the new growth, which is shortened at E. F: Barren laterals, which should be removed.

[Illustrations by courtesy Tasmanian Department of Agriculture]



PEAR: Lateral pruning. Leader shortened at A. Secondary growth removed at B. C: Light fruiting lateral left unpruned. Strong lateral, treated the previous year, has produced fruit buds, and is removed at D. EF: Treatment suggested for very vigorous growth. G: Lateral similar to D stopped the previous year. H: Light lateral similar to C, showing fruit buds forming after being left unpruned.



PLUM:—A: Leader shortened at A. B: Strong lateral removed at B. C: Lateral, replacing growth removed previous year, shortened at C, to force two laterals, which will be retained intact the following year. D: Light laterals retained to develop fruiting branches. E: Showing fruiting laterals developed from different classes of wood. These are removed when becoming barren. (Coe's Golden Drop.)

EVERGREEN AND CITRUS FRUITS

PLUMS

EUROPEAN PLUMS: Jefferson, Grand Duke, and such prune types as Fellenberg and D'Agen. Fruit mostly on laterals and limbs two or more years old. If left unattended, plums bear well enough for some years, but ultimately they develop barren or dead wood and the fruit becomes small.

Cut surplus laterals back to buds at the base. If the remaining laterals are strong, cut them by a half to stimulate buds. Short laterals are left untouched in the first year.

Laterals tend to become bare after they produce crops. Remove barren and semi-barren laterals.

Shorten the leaders slightly to preserve the frame and encourage new lateral development.

JAPANESE PLUMS: Fruit forms on short spurs on previous year's wood. The spurs lose vigour after a few seasons, and new laterals must be constantly developed. The treatment is essentially similar to apricots.

Cut laterals back to the leaders.

Shorten the leaders back to vigorous laterals to stimulate new lateral growth.

Thin out spurs and cut older laterals back hard, since Japanese plums tend to produce excessive quantity of fruit.

EVERGREEN AND CITRUS FRUITS

Evergreen fruits are pruned when growth begins in spring. Thinning out of shoots is a primary necessity to permit circulation of air, sunlight, moisture, to apply sprays, to control insects. Thinning out in evergreens is more important than thinning out deciduous trees. Evergreens are natives of sunny climates — the pruner has to balance between giving protection to the sensitive bark and insect and fungus attack.

ORANGES

In young orange trees the balance between root system and leaf system is very sensitive. You must prune the roots and top so as to achieve a perfect balance between the vigour of the top and the vigour of the roots. At the same time any cutting of the top must be made with a view to the future frame of the tree. The top is pruned in such a way that the remaining wood can develop into permanent limbs.

The seedling is pruned right from the start with a view to the future frame. Some seedlings have sufficient branches well spaced and at a proper height to require little pruning. These are merely pruned back to about four buds — pruning to the outside. Other seedlings may have such a weakly-formed basis that they may require severe pruning, even to removing all the foliage. A new head will develop on these later. If the roots have to be pruned on account of damage, the top may have to be more severely pruned accordingly. Select three or four suitable main arms to start a base. If they develop well, cut these back to suitable side shoots. Continue these shoots upwards and outwards in the form of an umbrella, reject those which open outwards too much and train the more vertical ones. The mature tree should develop as a spread-

ing arborescent shrub, with a copious lateral growth bearing the foliage.

Pruning the Mature Tree

Since oranges bear on terminal twigs of the new season's growth, heavy pruning is undesirable. The object is to increase the bearing surface. New shoots develop from just behind the fruit stalk. If these are crowded, cut some away, leaving the lowermost ones, at the same time removing the shoot which bore the fruit.

Further pruning is confined to removing dead wood and misplaced branches. Since orange bark is thin and readily sunburned, do not remove foliage unless adequate protection to limbs can be guaranteed. In summer water shoots may arise from old wood. Remove these unless they can be used to fill any gaps in the frame.

LEMONS

The young lemon is formed on the same lines as the orange. Young lemons are much more vigorously-growing than oranges, and therefore they need much closer attention until about three years old. From the start the aim is to obtain a wide, open centre in the mature tree.

PRUNING

Select early four well-paced and equally spaced leaders. These must be horizontally growing: from these will arise vertical growths. Now select two of the verticals on each leader as close to the centre as possible, removing the others. After about two years cut each of the verticals back to the vigorous lateral, which has developed upon it, one lateral growing to the right and the other growing to the left. Continue with this plan until the tree is about seven years old. It will now be about 8 ft. high, open in the centre, and clothed with fruiting wood in all accessible places.

Lemon bears differently from the orange. The best fruiting wood is in the centre of

the tree and not on the periphery; the fruit is borne on shoots all along the leaders, and not at the ends of them. The fruiting shoots from the laterals will grow in vertical, horizontal and downward positions.

Of these shoots it is found best to encourage the horizontals and cut back the verticals. All verticals, although appearing most vigorous on account of the upward flow of sap, take much longer to produce fruit. When the laterals extend in length and tend to hang down, they may be shortened back a little towards the parent branch. Cut out all overcrowding growth, crossed and dead wood.

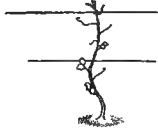
GRAPE VINES

The variety of a vine decides the method of pruning to be adopted. Those of sturdy, upright habit should be developed on the "bush" or "goblet" system. The creeping or trailing kinds do best on trellis, fences, or wires.

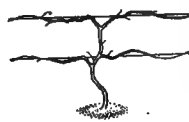
Correct way to prune grapes



Prune back to two eyes when setting out vines. 2nd year cut back plants to the same point



Main shoot is allowed to grow to top of wires 3rd Spring. To do this rub off all but one bud.



Side shoots grow 4th season. Rub off buds except strong ones on each side main shoot at wires.



Grown vine at end of 4th year should be pruned in January as shown in the previous sketch

Where there are two main arms trained horizontally in opposite directions, the system is called *espalier*; where there is one arm only it is called a *unilateral cordon*. If planting cuttings, choose the thick, brown, well-matured portions taken from the cane nearest the old wood.

During the first two years all vines may be pruned alike. At the end of the first year the young vine will be carrying a number of canes. All of these, except one, are removed; the one is cut back to a spur of two buds. These buds will, next year, send forth shoots which are again cut away, leaving two spurs at the desired height to form the future main arms. From buds left remaining on these arms will arise fruit-bearing shoots.

A variation of the spur method is called *rod pruning*. A rod may be defined as a shoot cut back, leaving six or more buds, instead of two as in the spur. This will produce more fruit-bearing wood, but can

only be applied to a strong, vigorous vine capable of meeting the extra demand.

The foregoing refers to the bush type vine. If it is to be developed horizontally, the cane selected for the permanent arm at the second year pruning is not cut back, but bent gently round and tied along the wire about 18 in. above the ground. The tied cane, or rod, will produce new shoots next season. Rub off any shoots on the underside of the tied rod. All fruit-bearing canes arising from the top side of the arm are cut back to spurs of two buds next pruning time.

A second permanent arm can be developed 18 in. above the first if the vine be sufficiently strong and vigorous. If the shoots for the arms have been twisted around the wire, instead of tying, they should be carefully unwound before they become too thick, and tied to the wire instead, to prevent it becoming embedded in the bark.

PRUNING

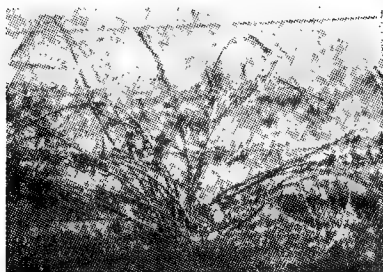
Pruning Brambles and Berries . . .

The unruly behaviour of the rubus family, the raspberries, etc., means vigorous pruning, which should not be postponed because of the prickles. In summer the suckers should be removed, weak shoots cut out, and old canes that have borne fruit cut down to the ground and burned. Only about six of the strongest shoots should be left for the new crop.

Black currants need no summer pruning, but every winter a number of shoots are cut clean out of the base. If red currants need the old wood removed during summer, cut back a little gradually each day. Leaders must not be summer pruned.



Black Currant, pruned, some growth cut almost to the ground.



Loganberry plant before pruning. All the present season's fruiting wood is cut to ground level.



Similar plant after pruning. Best of the season's wood has been retained and tied up to the support wires.

Pruning Berried Shrubs

Never prune these between the flowering and the berrying time; otherwise cut the long shoots where necessary to preserve the symmetry of the shrub after the berries have fallen, and remove dead wood.

HOLLY: Trim any straggling shoots to make bush symmetrical.

BERBERIS: Cut old wood back to main stems, and remove twigs to thin shrub.

If you omit to prune, as many people do, believing it a good idea to let shrubs develop in their own way, your shrubs will never do themselves justice.

Pruning Roses...

by T. HONYBUN, a leading exhibitor

THERE would be very few gardens in the temperate zones of Australia that are without roses, and to get the best results they should be pruned regularly each winter. To many gardeners rose pruning seems to be a very intricate and involved affair. If certain simple principles are followed, rose pruning should hold no terrors. Perhaps the first thing to remember is that roses should not be pruned on the fruit tree method.

In fruit trees the branches are retained and extended year after year and encouraged to develop spurs or laterals. The opposite is the case with roses. The golden rule is to try and encourage them to send up strong base shoots each year, as they are invariably the ones that furnish the best blooms. The modern roses of today, that is, the Hybrid Tea and Pernetiana, are in many ways akin to an herbaceous shrub in the way they send up strong shoots, retain them for a while, and, when they have served their purpose, replace them with new ones. When pruning roses be loth to cut out new wood unless it is badly placed or there may be such a quantity that some must be thinned out to make way for growths that should appear in the coming season.

The first step is to remove from the base of the plant all dead or spindly, twiggy growths. When this is done it is much easier to get an idea as to what should be left and what should be removed.

Unwanted Growths

Next is to remove any surplus growths that are badly placed, such as ones that cross through the centre of the plant or rub and cross other growths.

The tall new season's base shoots, commonly called water shoots, should be left till last.

Any branches that are healthy and well placed should be shortened back by about one-third of their length, and in nearly every instance should be cut to an eye pointing outwards, because this tends to make the plant more bushy and therefore gives more room for the flowers.

Now for the base shoots. These are easily seen because they have that young, vigorous, healthy appearance, and are usually tall and

straight, crowned with many flowers in the season.

Sometimes there may be as many as 30 or more blooms on the head of this one strong, vigorous growth.

As all these small branchlets on the top of the base shoot cannot be left, many should be removed, leaving two or three at the apex. Note treatment in plate 2C at 2. See also plate 1B, figures 1, 2, and 3.

When pruning the branchlets at the top of water shoots, care must be taken to see that eyes or buds are left so they will be able to send forth new growths in the coming season.

If in any doubt whatsoever, just pick off the spent flower heads and leave. Many people make the mistake of thinking that all branches on a pruned rose bush should be the same length. In rather rare cases this will happen, but in the majority they will be of uneven length and the pruning will have been done effectively.

Note difference in length of pruned growths in plates 1B, 2B, 2C and 3B.

When the growing season arrives, most rose bushes have the happy knack of making a nicely-balanced bush, no matter how lop-sided they may have been pruned in the winter.

The treatment above applies equally to standard roses, as they are identical except for the fact that they have been budded on a longer stock or base, hence their name of standards (see plates 3A and 3B).

If this seems very involved and hard to follow, another easy method, but not as effective as the foregoing, is to remove all old wood and leave the new, and if in doubt as to where to cut the new wood left, just leave it uncut and quite good results will be had in the growing season.

TREATMENT



Plate 1A
UNPRUNED

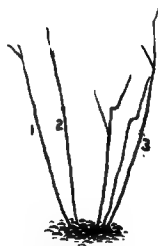


Plate 1B
PRUNED
1,2,3 WATER SHOOTS

Climbing roses are pruned in accordance with the above principles. The main arms which are retained should be spread out fanwise and tied in position. On no account let them assume a horizontal position. Sap flows to the highest point, and growth in such a case will not occur at the ends of the arm, but at the highest point along it.

In conclusion, always remember it is not so much what should be cut out and what should be left when pruning roses, but how many new growths can be encouraged to

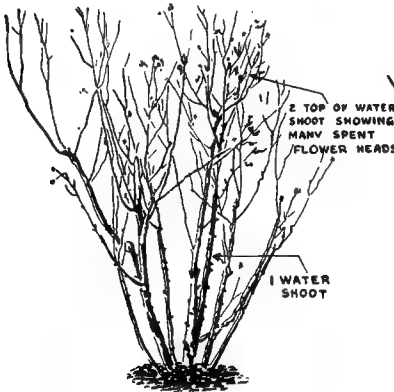


Plate 2A



Plate 2B
PRUNED LIGHTLY

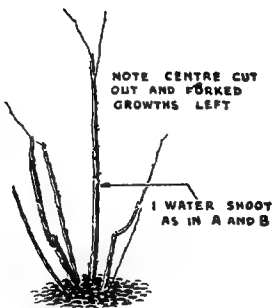


Plate 2C
PRUNED HEAVILY

appear in the coming season, because the stem, leaves, flower and seed pod all have to appear in the matter of weeks from the one small eye or bud that is in the joint of the leaf and the stem. If this can be remembered, lots of the trouble of rose pruning can be overcome. Now, do try and prune your own roses, as a little practice will soon show how.

*Our drawings are taken from actual photos
of bushes in the Doncaster garden of
Mr. Honybun before and
after pruning.*

OLD ROSE BUSHES AND CLIMBERS

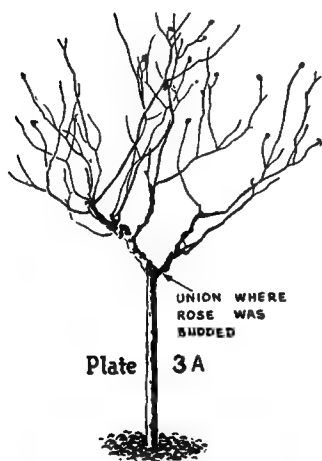


Plate 3A

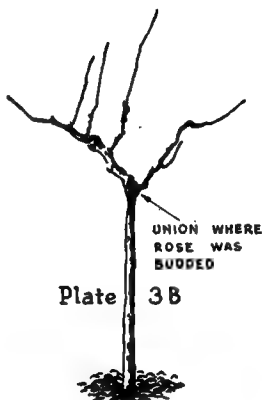


Plate 3B



Plate 4B
PRUNED



Plate 4A
UNPRUNED

Pruning Shrubs...

Shrubs and trees are either deciduous (leaf-falling) or evergreen (see page 241, 242, 249).

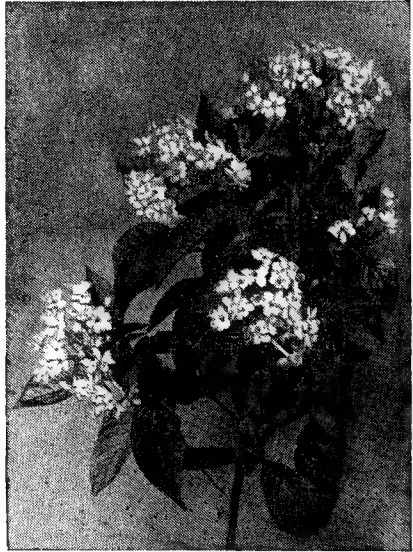
Many trees and shrubs can be sheared. Shearing is different from pruning; it is a form of pruning whereby all the young shoots extending beyond the limits of a shrub or hedge are cut to restrict the plant to a certain decorative shape—as cones, cubes or cylinders. This shearing must be performed regularly.

Every year prune the oldest branches of wood that are likely to die. Many shrubs can be pruned to make them tree-like, i.e., to grow on a single stem when all the branches are removed at the base, so that they are forced into a tree-like hedge. Such shrubs which look well under this treatment include Japanese Snowball, Lilacs, and Privets, Forsythia, Mock Oranges, etc. After the initial pruning a shearing each year will enable them to keep their tree-like shape.

PRUNING SHRUBS



CHAMAELAUCIUM UNCINATUM



VIBURNUM

Prune newly-planted shrubs. One of the great mistakes of gardening is to buy a plant in full bloom from the nursery and expect it to make great strides after the shock of transplanting. Many roots do not work immediately, and therefore the shrubs should be pruned severely. This method also ensures that you can plan for a good appearance in the near future as the plant becomes bushier.

Generally it is not advisable to cut back crab apples or prunus; a little thinning out of cross-growth is usually all they require. With some of the free-growing deciduous shrubs some cutting-back is often necessary to keep them tidy and within bounds; but here again severe pruning is best avoided, otherwise any plant so treated will lose that grace of outline which goes so much to make up the charm of every individual.

Winter pruning is essentially a different matter; so many different subjects need different treatment. The cestrum, for instance, may simply be cut over; while the hydrangea really needs careful thought and usually more or less severe pruning. Between these there are quite a few modifications which the gardener with a true gardener's eye will very soon appreciate.

HYDRANGEAS

The hydrangea, when properly treated, naturally renews itself from the base. Therefore, of necessity so much of the old wood must be cut right out each winter; the finest bloom is always borne on the new.

When pruning, first cut out weak and dead wood. Then cut back the previous flower-bearing stems as far as the second or third lowest pair of buds. Pruning is done according to season. Early cutting in March is practised in southern Australia; late cutting in July in northern areas.

There are several genera of the hydrangea, fuchsia, and especially the hybrid clematis, in which the sap is quickly excited by two or three sunny days in early July. The pruning of these should always be finished by the end of June. With the evergreen hibiscus and other frost-tender subjects the pruning is best left until September.

DAPHNE

The daphne is a plant that needs a light cutting over as flowering is finishing. The straggly wood arising from the centre of the plant should be shortened to produce shorter growths.

Pruning Table for Shrubs . . .

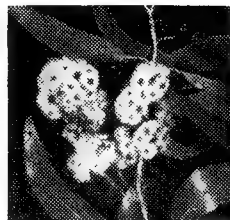
Name	Time of Pruning	Amount of Pruning
Almond, Flowering (<i>Prunus glandulosa</i>)	Prune after flowering.	Prune to remove dead wood only.
Amelanchier (Juneberry)	Prune before flowering.	Prune to remove dead wood only.
Australian Natives	Prune after flowering.	See separate section.
Berberis (Barberry)	Prune before growth starts in early spring.	Remove three-year-old wood to the ground.
Buddleia (Butterfly Bush)	Prune before growth starts in early spring.	Remove all two-year wood to the ground and prune back one-year growth to a few eyes each spring.
Calycanthus (Sweetshrub)	Prune after flowering.	Prune to remove dead wood only.
Cotoneaster	Prune lightly before blooming and similarly after, if flowers or berries desired.	Remove three-year wood to the ground.
Currant (<i>Ribes</i>)	Prune after flowering.	Prune to remove dead wood only. Remove three-year-old wood to the ground.
Cytisus (Broom)	Prune after flowering.	Prune to remove dead wood only.
Deutzia	Prune after flowering.	Prune to remove dead wood only. Remove three-year-old wood to the ground.
Dogwood (<i>Cornus</i>)	Prune lightly before blooming and similarly after, if flowers or berries desired.	Remove three-year-old wood to the ground.
Elder (<i>Sambucus</i>)	Prune lightly before blooming and similarly after, if flowers or berries desired.	
Forsythia (Golden Bells)	Prune lightly before blooming and similarly after, if flowers or berries desired.	Prune to remove dead wood only. Remove four-year-old wood to the ground.
Hibiscus (Shrub-althea)	Prune before growth starts in early spring.	Remove developed seed pods after they have formed. Prune to remove dead wood only.
Honeysuckle (<i>Lonicera</i>)	Prune lightly before blooming and similarly after, if flowers or berries desired.	Prune to remove dead wood only.
Hydrangea	Prune before growth starts in early spring.	Remove developed seed pods after they have formed. Remove all two-year-old wood to the ground and prune back one-year growth to a few eyes each spring.
Hypericum (St. John's Wort)	Prune before growth starts in early spring.	Remove developed seed pods after they have formed. Prune to remove dead wood only.
Kerria (Kerry Bush)	Prune before growth starts in early spring.	Prune to remove dead wood only.

PRUNING TABLE FOR SHRUBS

Name	Time of Pruning	Amount of Pruning
Lilac	Prune after flowering.	Remove developed seed pods after they have formed.
Magnolia	Prune after flowering, and prune as little as possible.	Remove developed seed pods after they have formed.
Mock Orange (<i>Philadelphus</i>)	Prune after flowering.	Remove three-year-old wood to the ground.
Privet (<i>Ligustrum</i>)	Prune before growth starts in early spring.	Prune to remove dead wood only.
Redbud (<i>Cercis</i>)	Prune after flowering.	Prune to remove dead wood only.
Rhus	Prune before growth starts in early spring.	Remove all two-year wood to the ground and prune back one-year growth to a few eyes each spring.
Spiraea	Early-flowering types—Prune after flowering.	Remove three-year-old wood to the ground.
Spiraea	Late-flowering types—Prune before growth starts in early spring.	Remove all two-year-old wood to the ground and prune back one-year growth to a few eyes each spring.
Symphoricarpos	Prune before growth starts in early spring.	Remove all two-year-old wood to the ground and prune back one-year growth to a few eyes each spring.
Tamarix	Prune lightly before blooming and similarly after, if flowers or berries desired.	Remove developed seed pods after they have formed.
Tree Peony (<i>Paeonia suffruticosa</i>)	Prune before growth starts in early spring.	Prune to remove dead wood only.
Viburnum, Fragrant (<i>Viburnum carlesii</i>)	Prune after flowering.	Prune to remove dead wood only.
Viburnum (except <i>V. carlesii</i>)	Prune lightly before blooming and similarly after, if flowers or berries desired.	Remove three-year-old wood to the ground.
Weigela	Prune lightly before blooming and similarly after, if flowers or berries desired.	Remove three-year-old wood to the ground.
Willow, Golden (<i>Salix vitellina</i>)	Prune before growth starts in early spring.	
Wistaria	Prune early spring.	Shorten all young growths to within two or three eyes of the wood.



NATIVES
RESPOND
WELL TO
PRUNING





Preparing a Garden

... FOR YOUR VEGETABLES

There are five ideal requirements for a vegetable garden:

- (1) *Good Soil.*—Deep, well drained, fertile, friable loam.
- (2) *Permanent and adequate water supply.*
- (3) *Plenty of sunshine.*—A northerly or north-easterly aspect.
- (4) *Shelter from winds.*—Best shelter from hot and cold winds are fences. Plant rows of sweet corn, climbing peas and beans, and artichokes between the beds in summer. Lupins in winter. Avoid nearby hedges and trees; these cast shadows and their root systems deprive the crop of soil food and water.
- (5) *Frost-free locality.*

Layout

An area of 1800 sq. ft., well cared for, can easily provide a year's supply of up to 15 varieties for a family of five. A spare-time gardener should begin with a plot about 20 ft. x 40 ft. Only constant cultivation can produce good crops, and a small, well-managed plot is more profitable than a large, badly-managed garden.

For convenience, arrange the area into rectangular beds about 4 ft. wide — these should run north-south to receive the maximum sunlight. If the site slopes noticeably, arrange the beds across the slope rather than up and down it.

A garden of any size requires permanent paths about 18 in. wide to separate the beds. Use concrete, brick, gravel, or lawn.

It is an advantage to support the edges of the beds with boards or concrete, or with borders of useful herbs, such as thyme.

In heavy loam soils it may be necessary

to raise the level of the beds from 6 in. to 12 in. above the paths to encourage drainage. This may be necessary only in winter, when waterlogging may come within inches of the normal surface. Lighter soils with sufficient drainage and depth may not need raising. Raising the soil is done during digging.

Soil Preparation

All vegetables are highly evolved and specialized plants. It is impossible, therefore, to over-emphasize the importance of thorough soil preparation.

The aim is a good, fertile, friable loam. Essential preparation consists of digging, trenching, if the soil be virgin or unused for several years, liming and organic enriching.

Dig deeply to 10 inches. If sub-soil is shallow, break up the top layer of it to offset waterlogging. Leave the

CORRECT FERTILISERS

soil rough, in fallow, until planting time. Finally break the clods down into fine tilth.

Following: See page 56.

Preparatory sowing bed: See page 53.

Hints on Cultivation

Use a fork, hoe and rake. Use care and don't disturb surface roots, especially of onions, and not too closely to the plants.

Cultivate when soil is moist, and not excessively, or you will produce a dust surface. But cultivate regularly to enable water to be absorbed, and to destroy weeds.

Remove weeds when young, and by hand if close to the plants. Weeds seriously compete for water.

Watering: See page 54.

Mulching: See page 60.

Fertilizer Requirements

The following indicates the essential mineral requirements of the main groups (which see under Crop Rotation).

GROUP 1 (Leaf Crops). Heavy feeders, requiring abundant nitrogen, but not in excess. Prepare bed with well rotted organic matter, especially animal manure. Apply especially artificial nitrogenous fertilizer, solid or liquid, and liquid animal manure.

GROUP 2 (Root Crops). Need mature soil where roots can penetrate; a previous leaf crop bed, previously enriched in organic matter, is excellent. Avoid contact with fresh manure. In poor soils apply potash and superphosphate in equal quantities.

GROUP 3 (Legumes and some others. See Crop Rotation). Need larger quantities of phosphorus and potash. A good complete mixture is sulphate of ammonia (or nitrate of soda), superphosphate, potash (1:3:4), $\frac{1}{2}$ lb. per square yard. Legumes leave the soil enriched in nitrogen, which they manufacture in their root nodules.

Fertilizer placement: See page 50.

Crop Rotation

Different crop plants remove chemicals from the soil in varying proportions: leaf

crops (cabbages) remove more nitrogen than root crops (carrots). Hence single crops grown on the same plots in time deplete the soil of minerals unevenly. Moreover, deep feeders (carrots, leeks) take out more than surface feeders (onions) and the different layers will become unevenly depleted.

To preserve the balance, plant a succession of crops on the same plot. There are three groups which can be thus rotated:

GROUP 1 (Leaf Crops). Cabbage, brussels sprouts, cauliflower, lettuce, rhubarb, broccoli, tomatoes, silver beet, celery.

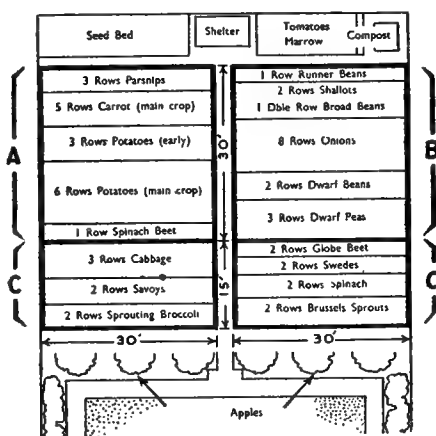
GROUP 2 (Root Crops). Turnips, parsnips, carrots, kohlrabi, beet, radish, potatoes.

GROUP 3 (Legumes and certain others). Onions, leeks, cucurbits, vines, sweet corn.

Rotation may not be practicable in a small garden. If so, plant the same crop in different places each new sowing. This will also very greatly assist in the control of insect pests, and virus and fungus diseases.

The ideal rotation is leaf crops following root crops, and legumes following either leaf or root crops.

Hence plot A (mostly roots) follows plot B (mostly legumes); plot B follows plot C (mostly leaves); plot C follows plot A.



Month by Month **in the VEGETABLE GARDEN**

VEGETABLES	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
Beans, Broad												
Beans, Butter												
Beans, French												
Beet												
Beet, Silver												
Borecole												
Broccoli												
Brussels Sprouts												
Cabbage												
Cape Gooseberry												
Capsicum												
Carrot												
Cauliflower												
Celery												
Cucumber												
Egg Plant												
Endive												
Herbs												
Kohl Rabi												
Leek												
Lettuce												
Melons												
Mustard & Cress												
Onion												
Parsley												
Peas												
Pumpkin												
Parsnip												
Radish												
Rhubarb												
Savoy Cabbage												
Spinach												
Squash												
Swede Turnip												
Sweet Corn												
Tomato												
Turnip												
Veg. Marrow												

The **BLACK** squares indicate main sowings. The **GREY** squares indicate small or supplementary sowings.

Vegetables straight from your own garden are more tasty, more healthful and richer in vitamins.

Planting and Yield Chart

VEGETABLE	Amount for 50 ft. Row	Depth to Plant	Space between Plants	Space between Rows	Days to Come Up	Days to Mature	Yield from 50 ft. Row
Asparagus	16 roots	—	18 in.	48-60 in.	—	3 yrs.	20 lbs.
Bush Beans	$\frac{1}{4}$ lb. seed	$1\frac{1}{2}$ -2 in.	4-6 in.	24-36 in.	6-10	50	15-25 lbs.
Pole Beans	$\frac{1}{4}$ lb. seed	$1\frac{1}{2}$ -2 in.	6 in.	36 in.	6-10	60-75	35-40 lbs.
Bush Lima Beans	$\frac{1}{4}$ lb. seed	$1-1\frac{1}{2}$ in.	3-4 in.	24 in.	6-10	60-75	10-15 lbs.
Pole Lima Beans	$\frac{1}{4}$ lb. seed	$1-1\frac{1}{2}$ in.	6 in.	36 in.	6-10	75-90	35-40 lbs.
Broad Beans	$\frac{1}{4}$ oz. seed	2-3 in.	6 in.	36 in.	6-10	40-60	35-40 lbs.
Beetroot	1 oz. seed	1 in.	6 in.	18 in.	7-12	60-75	35 bunches
Broccoli	30 plants	$\frac{1}{2}$ in.	18 in.	20 in.	—	112-126	30-50 lbs.
Brussels Sprouts	33 plants	$\frac{1}{2}$ in.	20 in.	24 in.	—	112-126	15-25 lbs.
Cabbage	37 plants	$\frac{1}{2}$ in.	15-30 in.	15-30 in.	—	60-90	30-37 heads
Carrots	$\frac{1}{2}$ oz. seed	$\frac{1}{2}$ in.	4-6 in.	12 in.	10-15	70-90	35 bunches
Cauliflower	30 plants	$\frac{1}{2}$ in.	36-48 in.	36-48 in.	—	80-100	25-30 heads
Celery	100 plants	$\frac{1}{4}$ in.	6-12 in.	24-36 in.	—	110-140	90-100 bunches
Corn	1 oz. seed	1-2 in.	12-18 in.	36-48 in.	8-10	70-100	75-100 ears
Cucumbers	$\frac{1}{4}$ oz. seed	$1\frac{1}{2}$ in.	48 in.	60 in.	6-8	65	1 bushel
Endive	$\frac{1}{4}$ oz. seed	$\frac{1}{2}$ in.	9-12 in.	12-18 in.	6-8	80	50 heads
Lettuce	oz seed	$\frac{1}{4}$ in.	12-15 in.	12-18 in.	6-10	40-60	15-20 lbs.
Onion	$\frac{1}{4}$ lb. seed	$\frac{1}{2}$ in.	5 in.	18 in.	6-8	30-80	175 lbs.
Parsnip	$\frac{1}{4}$ oz. seed	$\frac{1}{2}$ in.	6 in.	12-18 in.	—	120	1 bushel
Peas	$\frac{1}{2}$ lb. seed	$1-1\frac{1}{2}$ in.	3 in.	12-18 in.	6-10	60-90	20 lbs. pods
Peppers	37 plants	$\frac{1}{2}$ in.	24 in.	30 in.	—	80-100	150 peppers
Potato	5 lbs. seed	—	18-24 in.	36-48 in.	15-25	120	175 lbs.
Radish	1 oz. seed	$\frac{1}{2}$ in.	2-3 in.	6 in.	4-6	28-35	15-20 bunches
Spinach	oz. seed	1 in.	6 in.	18-24 in.	15-25	50	15 lbs.
Summer Squash	$\frac{1}{4}$ oz. seed	1-2 in.	36 in.	36-48 in.	6-10	50-80	2 $\frac{1}{2}$ bushels
Winter Squash	oz. seed	$1\frac{1}{2}$ -3 in.	72 in.	72-96 in.	6-10	90-100	250 lbs.
Tomato	30 plants	$\frac{1}{4}$ - $\frac{1}{2}$ in.	30-48 in.	36-48 in.	—	100-120	10 lbs. per plant
Turnip	$\frac{1}{2}$ oz. seed	$\frac{1}{4}$ - $\frac{1}{2}$ in.	4 in.	18-24 in.	4-7	60-75	25-30 lbs.



Vegetables pay dividends

Artichoke—Globe

A hardy perennial, preferring a light loam. Sow seed in spring, in drills about 1½ in. deep. Transplant to rows 3 ft. apart, 2 ft. between plants. Supply richly with manures. The plants grow to 4 ft. Best crops occur in the second year. Eat the buds, green, before flowering. When suckers appear new beds can be made from these.

Artichoke—Jerusalem

A hardy plant; grows in most soils and positions. Best soil is a deeply dug, moderately rich loam. Prepare the bed with superphosphate and organic matter. Potash is most desirable, a cheap form being copious dressings of wood ash.

Set tubers in drills 6 in deep, 2 ft.

apart, 15 in. between tubers. A pound of tubers suffices for an area 15 x 5 ft.

Earth up the plants when a foot high; pinch the tops when 4 ft. tall. They mature when tops wilt and yellow. Tubers do not keep, so dig only when required.

They can be planted in the same soil year after year, but replenish the fertilizers and set the tubers throughout the spring.

Asparagus

Is fairly easy to grow and bears up to three months of the year. Ample space is necessary. A carefully managed bed will bear crops for years. Deep loam is ideal, in a sunny position.

Thorough preparation is essential. In late autumn form a trench a foot deep

VEGETABLES

and a spade's width wide, adding decayed manure in quantity; since this plant is a heavy feeder there is almost no limit to this. Also add to the manure a complete fertilizer, including blood and bone, $\frac{1}{2}$ lb. per yard of trench. Cover this with 3 in. of soil.

In late winter place crowns at 18 in. intervals, spreading the roots downwards. Plant firmly, 2 in. deep. As the plant develops fill in the trench.

The crowns should be either one or two years old, preferably one year old for the novice. Two dozen are sufficient for an average family.

Little attention is required in the first winter. In the early spring begin to hill the plants to produce blanched shoots.

In the following winters break down the hills, cultivate and re-form the hills.

Make the first cuts only in the spring of the second year. The mature cutting stage occurs in the third spring, and can extend over the next three months.

In summer, after cutting the crop, dig in heavy dressings of animal manure and complete fertilizer, at least $\frac{1}{2}$ lb. per 3 ft. of hill, to replenish growth and develop the crowns.

Each autumn the tops turn yellow and run to seed. Cut off and burn. Avoid scattering the berries, which will produce seedlings as weeds.

Green asparagus is obtained by allowing the spear shoots to reach 4 in. above the surface. Blanched asparagus is cut when the tips just break the surface. Cut with a sharp knife, along the shoot, below the surface, without injury to new shoots or crowns.

Asparagus deteriorates in food value very rapidly after cutting, and should be eaten immediately.

Keep moist in summer and at all times weed and cultivate well.

Beans

Choose any soil in a sunny, sheltered position, well drained, fairly fertile and loose enough to enable germinating shoots to emerge. If the surface cakes hard, mulch well. A previously well manured leaf crop soil is ideal. Rake the soil after planting to conserve moisture. If you

soak the seeds before planting, allow plenty of water.

Lime is most desirable— $\frac{1}{2}$ lb. per square yard in unlimed soil.

When 6 in. high, hill them, and again later.

At budding time, and three weeks later, apply sulphate of ammonia, a tablespoon per 2 yards, but no more, as a side dressing.

Pick regularly, water well, and cultivate shallowly.

Sow preferably when the cold is past. Cold slows germination and may even cause rotting of the seed.

FRENCH (OR DWARF) BEANS:

Sow 4 in. apart in rows 2 ft. apart. Sow $1\frac{1}{2}$ in. deep in moist soil, deeper in dry soil. Apply fertilizer heavily—a superphosphate, blood and bone, sulphate of ammonia mixture (2:2:1), or complete fertilizer, $\frac{1}{2}$ lb. per 10 yards of drill.

Dwarf beans sprout very quickly—within a week.

Sow every two weeks to ensure a continuous supply. Twenty feet of row provides for an average family. Sow in a different place each time to reduce risk of disease and red spider.

CLIMBING (OR POLE) BEANS are much more productive than dwarf types, and bear over a longer period. Sow 6 in. apart, in rows about 3 ft. apart.

Train on to strong trellis work or other supports. Fertilize and cultivate as for dwarf beans.

STRINGLESS BEANS. Most dwarfs are stringed types. There are a few new stringless types, heavy bearers, with big fleshy pods. These deserve cultivation.

LIMA BEANS can be cooked green or left until dry. Two types—a bush variety with larger pods, and a climbing type with shorter pods—are prolific bearers. Gather regularly. Germinate only in warm soil. See chart for sowing.

TONGAN BEANS: A perennial, with very long tendrils. Suitable for tropics and sub-tropics, but no further south than mid New South Wales. Introduced from Tonga.

VEGETABLES

Very prolific bearer, yielding immense quantities of broad, flat beans, 2.5 in. in length, 1½ in. wide.

Pick and cook in young stage, as for French beans.

Beetroot

Well manured, deeply cultivated soil from a previous leaf crop is ideal. Apply lime about ¼ lb. per square yard. Don't apply fresh manure of any kind, although well rotted manure well in advance is desirable.

Apply complete fertilizer, 1½ lb. per 10 ft. of drill; make these drills 3 in. wide, 4 in. deep, 18 in. apart.

Sow directly above, 1 in. deep, when soil is moist, a little deeper when drier. Firm the soil before and after sowing. Try soaking the seed first.

Thin out to 6 in. between plants. Try using the thinnings for transplanting, inserting into deeply dibbled holes.

Water regularly. When half grown, apply sulphate of ammonia, 2 oz. per 2 yards, as a side dressing.

Banking the soil is unnecessary.

Borecole (Kale)

Is essentially a cold climate crop, requiring frosts to mature. Its soil and fertilizer needs are as for cabbage; likewise its sowing and cultivation.

There is no heart. Pull the large leaves from the bottom. These are ready five months after planting.

Sow from late spring to early summer.

Broad Beans

These are the hardiest beans; they can withstand severe frosts, and are thus a useful winter food. The ideal soil is fairly heavy loam, lime-rich (4 oz. per square yard), containing plenty of organic matter.

Prepare drills 4 in. wide and 6 in. deep, in double rows, 6 in. apart, with a yard between the double rows.

Apply complete fertilizer, or a mixture of superphosphate and ammonium sulphate, 4 parts to 1, 1½ lb. per 10 yards of drill, along the corners of the drill.

Too much nitrogen may prevent pod setting.

Fill in and sow in drills 3 in. deep, directly above, 6 in. between seeds.

When flowering is advanced, assist pod setting by pinching back the tips of the growing shoots. When 18 in. high, apply a side dressing of superphosphate, 1 oz. per 2 yards of drill.

In very cold areas, sow only during spring. In temperate areas, sow from autumn to mid-winter. In the tropics, sow only in the autumn.

Broccoli

The popular variety has green heads, resembling that of the cauliflower.

Prepare soil, sow and cultivate, as for cabbages. Sow to a depth of ½ in. only.

Heads are ready a month after sowing, and will re-form quickly for some weeks. Unless used quickly, the shoots break into flower.

Brussels Sprouts

Are best suited to cold areas, but can be successful in warmer areas. Like cabbages, the best plants are reared in a warm growing period, followed by cold and frosts, when the hearts become hard and compact. Pick before bursting.

Prepare soil, sow and cultivate as for cabbages.

Cabbages

Grow in most thoroughly dug, well drained, rich soils, in an open, sunny position.

Sow seed thinly, ½ in. deep, in a well prepared seed bed, preferably of a sifted soil-animal manure mixture, equal parts, dusted with superphosphate and lime.

Thin out early, and when 4 in. high transplant. Prepare the permanent bed some weeks in advance; dig deeply and add lime, ½ lb. per square yard. A week prior to transplanting add a heavy animal manure dressing.

Form drills 6 in. deep, 4 in. wide, 3 ft. apart. Apply complete fertilizer, or a superphosphate - sulphate of ammonia - blood and bone - sulphate of potash mixture (1:2:1:1), at the rate of 2 oz. per yard of drill in the usual way.

Fill in the drill and place seedlings

VEGETABLES

directly above, larger varieties 3 ft., and smaller ones 15 in. apart.

Raise quickly—give nitrogenous fertilizer regular each fortnight, a teaspoonful of ammonium sulphate per plant.

Water thoroughly and regularly; weed constantly by shallow cultivation.

Short growing varieties are most popular. Usually these are sown in spring and mature by summer. Sow others in late summer, to mature by mid-winter.

Seek out the correct variety, otherwise they run to seed when planted out of season.

Cape Gooseberry

The fruit is eaten raw or used in jams. Sow in spring after frost danger, in warm soil, deeply dug, enriched with organic matter. Sow in boxes, or directly into beds, 1 in. deep.

Transplant when 3 in. high, up to 3 ft. apart. With liquid fertilizer, fruiting occurs within 5-6 months. Sow afresh each spring in cold climates. In warm climates, the plants remain fruiting for up to three years, but cut back after each crop.

Capsicum—see Peppers

Carrots

The ideal bed is a deeply dug, well-drained and friable loam, previously greatly enriched for a leaf or legume crop.

Since both fresh animal manure and artificial fertilizer in contact with seedlings can cause forking, the bed must be prepared about a month before sowing. Dig in 3 oz. of complete fertilizer, or 1 oz. of superphosphate per square yard.

Sow seed in permanent drills, 1 ft. apart, and no deeper than $\frac{1}{2}$ in. Sow thickly. Cover lightly with soil.

The soil must be kept moist for the seedlings to emerge and establish; cover the drills with a well rotted mulch. Thin to 4 in. apart when about 2 in. high.

At all stages water and weed by shallow cultivation. A tablespoon of ammonium sulphate to each 5 ft. is useful after thinning out.

Cauliflowers

Soil requirements and cultivation similar to cabbages. The soil must be well drained, well dug in depth, and very well manured.

Sow the seed in boxes, as for cabbages, thinly, $\frac{1}{2}$ in. deep, in rows 3 in. apart.

Dig in lime, $\frac{1}{2}$ to 1 lb. per square yard, in unlimed soil. A week before transplanting add manure—animal 4 in., poultry 2 in.—or compost 2 in., with complete fertilizer, 3 oz. per square yard.

Transplant when 5 in. high, on a cool day, lifting very carefully to preserve the root system. Dip in lead arsenate to counter cabbage moth and butterfly.

Shade the seedlings adequately. When the white curd forms, give nitrate of soda or sulphate of ammonia, 1 teaspoonful per plant, every three weeks, or regular dressings of liquid manure.

Hill when half grown to strengthen against wind. Soak well and thoroughly.

Some varieties need their leaves tied over the curd to protect it.

Celery

Thorough soil preparation and good drainage are essential. Dig deeply, adding 1 lb. of lime per square yard to unlimed soil, less if recently limed, and allow to fallow as long as possible.

A week or so before transplanting, redig and add animal manure dressing 4 in. thick, or poultry manure, 2 in. thick.

Seed is difficult to germinate. Sow in a carefully made seed bed, $\frac{1}{4}$ in. deep, thoroughly protected from sun. Keep well moist.

Thin seedlings to 2 in. Transplant when 5 in. high. Lift carefully, with all roots and soil intact, and in cool of day. Place 6 to 12 in. apart.

Form permanent drills 2 ft. apart, or double drills 9 in. apart, 3 ft. between the double rows. Below the drills apply complete fertilizer, or a superphosphate-sulphate of ammonia mix (2:1) at 2 oz. per yard of single row.

When established apply liquid manure fortnightly. When half grown give nitrate of soda or sulphate of ammonia, 1 tablespoon per 5 ft. of single row.

Start blanching a month before pulling.

VEGETABLES

If sown close together (up to 6 in.), closely placed boards are sufficient. If widely (over 12 in.), use cylinders of cardboard or darkened paper, 15 in. high, around each plant.

If placed to blanch in trenches, which are gradually filled in, there is a risk of disease.

It is impossible to supply too much water, if drainage is adequate. Between waterings cultivate shallowly and weed.

Chinese Cabbage

Easily grown in reasonably rich, well prepared soil.

Sow in boxes as for cabbage and transplant. Transplanting must be careful, because the seedlings are brittle. Better to sow in permanent beds, thinning when 5 in. high to 12 in. apart.

Water amply, especially in hot weather, and apply liquid fertilizer freely, 1 oz. of sulphate of ammonia per six plants. Heads are ready in up to 10 weeks after transplanting.

Sow in early autumn, so as to mature in the following colder season, and avoid running to head. These plants are not suited to frosty climates.

Use in salads raw, or cook as spinach.

Chokos

This is a perennial climber, producing abundant fruit, cooked as a marrow, from summer till autumn. Choose rich, well drained soil, in a warm, but sheltered position.

Choko is grown from sprouting tubers. Set these out in late winter or early spring, when the plant resumes growth after the winter dying off period. Protect the young shoots above ground from frost.

Prepare a large bed, with a long lasting fertilizer, including copious organic matter of all forms and wood ash (potash).

Place the tubers 3 in. below the surface, shoot end upwards.

Keep well watered in dry hot weather.

Cress

Grow quickly. Sow and rear in boxes containing light, friable, rich loam. Sow

thickly in rows $1\frac{1}{2}$ in. apart, covering lightly with sieved soil or leaf mould. Keep well moistened and well shaded.

Cut close to the surface when an inch high, at flowering. It matures in a month.

Sow together or without mustard. If needed with mustard, sow 10 days earlier.

Cress, Water—see Water Cress

Cucumbers

See Cucurbits.

Pick while young. Leave three plants per "hill," 4 ft. between "hills," and 5 ft. between rows.

Cucurbits

Choose fairly rich loam. Dig in much well rotted animal manure, or fertilizer, superphosphate-blood and bone (2:1), with some potash, $\frac{1}{4}$ - $\frac{1}{2}$ lb. per group of plants.

Lime, $\frac{1}{2}$ lb. per square yard, in unlimed soil; less if previously so.

Dig thoroughly and allow to settle before planting.

Sow at the beginning of warm weather, after the frost danger. Sow seed in pots under glass before frost, and set out later.

Place seed in a slight soil depression, up to $2\frac{1}{2}$ ft. in diameter. This can be on the top of a broad low mound, or on the unraised surface. Each depression, on its mound, is called a "hill."

Set six to eight seeds in this "hill" to a depth of 1-2 inches, except for pumpkins and running squash, which are set slightly deeper.

Cover the planted seeds with mulch to prevent soil drying.

After germination, thin out according to each type.

The distance between "hills" varies according to the type.

The roots are fairly shallow. Weed constantly, but with great care. Water amply in the early stages, especially for watermelon.

For heavy crops, apply liquid fertilizer or manure.

Remove the fruit as it matures, or the plant will lose productivity.

VEGETABLES

These plants bear male and female reproductive organs on separate flowers. If the pollen is not transferred by bees, or by lack of one kind of flower, the fruit will not set. In this case, pollinate by hand, using a soft camel-hair brush, preferably in the early morning.

All types of melons, cucumbers, squash, marrow and pumpkins can be made to set fruit earlier, when the female flowers have developed, if the ends of the runners are pinched off.

See page 164.

Egg Plant

Soil preparation and requirements as for tomato. Thrive in a sunny, well drained position. Is easily grown in temperate to warm climates. Raise and cultivate as for tomato. Maturity may take up to six months after germination. Permit only up to 10 fruits per plant.

Endive

Cultivate and raise as for lettuce. It must be blanched: Cover with a thick layer of straw, pots, etc. Or lap the outside leaves over the heart and tie in place.

This is a suitable substitute for lettuce in hot areas where lettuce cannot thrive.

Eschalots (Shallots)—see Onion

Jam (Preserving) Melon

See Cucurbits.

Cultivate in a similar way to watermelon.

Kale (see Borecole)

Kohl Rabi (Turnip-rooted Cabbage).

Most suited to cold climates, but succeeds in warmer areas in rich, well watered soil. Has a long maturing period. Sow from later summer to April. In cooler areas, sow in spring.

Soil requirements and preparation as for cabbage. Fertilize with superphosphate, potash and bone dust, 2 oz. per square yard.

Sow directly into permanent beds; it

does not transplant well. Thin out to 8 in. apart, 18 in. between rows. Soak in dry weather. Liquid manure fortnightly. Cultivate for weeds. Do not hill.

Harvest when roots 3 in. in diameter. Both roots and leaves are edible.

Leeks

Are easily grown. Ideal soil is light and deeply worked. It cannot be too rich. Raise seedlings in a seed-bed. Sow seed $\frac{1}{2}$ in. deep, 3 in. apart. Firm the soil before and after planting. Transplant when 5 in. high.

Prepare permanent drills 18 in. apart, 8 in. deep and 4 in. wide. Apply complete fertilizer in bands along the two corners of the drill, at a total rate of $\frac{1}{2}$ lb. per yard. Potash is excellent; wood ash is a cheap and abundant form. Fill in drill to depth of 4 in.

Transplant 8 in. apart. When transplanting, cut the leaves back by a third to induce root formation.

Water amply. During growth fill in the trench to effect blanching. If soil be shallow and wet do not trench, but plant on the surface and raise the soil around the stems.

Lettuce

Are available in all seasons in all States if the correct variety be chosen. Choose well dug medium soil, with plenty of well rotted animal manure. Lettuce must be grown quickly, without interruption, or they will become tough, bitter, and run to seed.

When well established, give regular side dressings of sulphate of ammonia, or nitrate of soda, every 10 days.

At all times keep well watered, especially in hot weather. Loosen the surface soil in winter and mulch well in summer.

Sow in boxes during the cooler months and transplant. In hot weather, sow into permanent drills, $\frac{1}{2}$ in. deep, 6 seeds every foot, the drills being 18 in. apart. Transplanted seedlings tend to run to seed in summer. Thin out progressively, 12 in. apart.

Apply complete fertilizer, 1 oz. per 3 ft. of drill before sowing or transplanting.

VEGETABLES

Make new sowings regularly to ensure continuity of crop. A 10 ft. row each fortnight suffices an average family.

Marrows

See Cucurbits.

Must be grown quickly. Bush marrows are best in smaller gardens, the "hills" being only 4 ft. apart. Thin out to two plants per "hill."

If space is no consideration the long running types will give bigger yields.

Supply water and liquid manure regularly so as not to check growth at any stage.

Mushrooms

Raise in a rain, draught and seepage-proof shed, soundly constructed. Whether or not it admits light is irrelevant. The temperature range lies between 50 and 70 degrees Fahrenheit. Summer is the best period, especially if humidity is high; other months are quite successful.

FORMING THE COMPOST: Use any farmyard or stable manure, 20% of it to be straw. Any quality less than 1 cubic yard is pointless.

Manure which has lost its heating power is useless; it must not contain wood shavings, sawdust or tan bark. Form into a longish and conical heap, at least 4 ft. high.

Dampen evenly and leave four days. Then turn the heap, inside to the outside and vice versa. Repeat five times in a day, every four days. Dampen during the first three turnings, sufficient to maintain the heating, but with no fluid in excess.

Final maturity depends on the weather; it occurs later when colder. When squeezed in the hand it should hold together, without any sign at all of surplus moisture. If too dry add fresh manure, dampen, and resume composting for at least a week.

When still warm, form compost into beds, 3 ft. wide when worked from one side only; 6 ft. wide when attended both sides. Compress quite firmly, to withstand trampling, without looseness or springiness.

Make holes with sticks and insert a thermometer; when constant at 75 deg. Fahr., insert spawn. Spawn is obtained in bricks; better still is pure culture. Break

in pieces, walnut sized, insert with fingers 1-2 in. below surface. One brick plants 1 square yard. *Use only fresh spawn.*

Leave the bed undisturbed a week, covering with paper to conserve its moisture. Then cover the bed with an inch layer of sifted medium to clay loam (water retaining). Keep moist, but prevent water penetrating to the compost. This would ruin the bed. The crop will appear in six weeks in warm weather.

MUSHROOMS IN THE LAWN: Lift a square foot of turf, remove the soil to 9 in., and fill with compost, produced as above, or with well rotted cow manure.

Insert the spawn just below the compost surface, and replace turf. The turf should not exceed 2 in. in thickness. Firm down thoroughly.

Mustard—see Cress

Onions

Succeed in any bed which has been thoroughly dug and manured for a previous crop. The soil must be alkaline—if it is acid, apply up to $\frac{3}{4}$ lb. lime per square yard before transplanting. Add organic matter, but nitrogenous matter only very lightly. This would produce bulky leaves, small bulbs, and susceptibility to disease.

Sow seed in boxes in light, friable soil, in drills, 4 in. apart. Firm the soil before and after sowing. Transplant when 6 in. high into rows 12 in. apart, 5 in. between plants. It is a good idea to plant a double row. Trim the roots back to $\frac{1}{2}$ in., and the leaves to 2 in. of the crown. Apply complete fertilizer, 2 to 3 oz. per yard, along the drill. Plant with the bulb mostly free.

Weeds are strong competitors. Weed very carefully. Hoe regularly, but carefully. Wood ash (for potash) is a safe stimulant if growth is slow.

Bend the tops right to the ground when the leaves turn brown, and leave until completely dried off.

Choose the correct variety for the location and climate.

SHALLOTS: Are raised from sets of cloves. The conditions of growth of similar to the above. Grow closely together. Divide the sets and plant separately.

VEGETABLES

WHITE ONIONS: Not good keepers. General purpose onion, often of large size.

SPRING (or SALAD) ONIONS: White onions which are grown until the base of the stem begins to thicken.

BROWNS: Long-keeping.

TREE ONIONS: Not common, but worth a try. Bulbs form on top of stems. Plant in autumn. Useful in warm climates. Suitable for pickling.

ODORLESS: With ample food, are heavy croppers. Non-keepers.

Parsnips

The ideal bed is a deeply dug and friable loam, previously enriched for a leaf crop, where the long tapering roots can penetrate.

Since both fresh animal manure and artificial fertilizer in contact with seedlings can cause forking, the bed must be prepared about a month before sowing. Dig in 3 oz. of complete fertilizer, or 2 oz. of superphosphate per square yard.

Sow seed in a fine tilth in permanent beds, no deeper than $\frac{1}{2}$ in., 15 in. between rows. Seed is difficult to germinate; sow thickly, cover lightly. *Fresh seed is essential.*

The soil must be kept moist for the seedlings to emerge and be established. Mulch in summer. Thin to 2 in. apart when a few leaves appear, finally to 6 in. apart. Use the thinnings.

Apply a light superphosphate dressing when half grown.

At all times water lightly, and weed by shallow cultivation.

Peas

The ideal soil is a deep, well drained loam in a sunny position, as previously used for a leaf crop. Lime is essential; add this when digging for the bed, 1 lb. per square yard, or as a top dressing after sowing, watered in. Add well rotted animal manure or superphosphate, especially to heavy clay soils. Add potash and ammonium sulphate to sandy soils. Drain these well.

Form drills 4 in. deep, 4 in. wide, and add fertilizer, either complete fertilizer or a superphosphate-ammonium sulphate mixture (4:1), 1 lb. per 60 ft. Sow $1\frac{1}{2}$ in. deep, 1-2 in. between seeds, directly above. Form the rows 2 ft. 6 in. apart.

Before sowing, dust the seed with fungi-

cide by shaking in a bottle, 1 teaspoonful per 1 lb. of seed. Peas are readily susceptible to rot-causing organisms in the soil. Train on trellises or other supports.

Control weeds by shallow cultivation. Keep moist. Apply fertilizer on flowering, but no later; superphosphate and blood and bone, or complete fertilizer.

Peppers (Capsicum)

Soil preparation and requirements as for tomato. Sow after frost danger, or protect under glass. Raise as for tomatoes. Sow in seed beds, of fine soil, in rows 2 in. apart, $\frac{1}{8}$ in. deep, covered with mulch. Keep moist. Transplant, when 4 in. high, to 2 ft. apart. Water well, liquid side dressings. A slow grower in cold climates.

Potatoes

A suitable crop for virgin soil. Two crops a year are possible; a winter crop raised from a February planting, and a summer crop from a spring planting.

Sow according to the frost periods, since these plants are very frost susceptible.

Space is essential. The best soil is well drained, rich in organic matter, animal and plant. For the spring sowing, leave fallow all the winter. Lime only if the soil is very acid; otherwise scale disease will form.

Good seed is very important. Use only Government certificated seed, or healthy seed raised from such. Small tubers may be left whole; cut larger ones into 2 oz. units, each to have preferably two good eyes.

Do not use cut tubers if the weather be warm or dry, or if soil be dry. Dry out cut tubers in the air before planting, but do *not* rub in ash or lime.

Before cutting and planting the tubers, "green-sprout" them by exposure to light on trays in a dry, airy position. Select only those with healthy, strong, short shoots, since the others may be virus infected.

To plant, form drills 6 in. wide, 8 in. deep, raising the floor of the drill into a ridge 2 in. high. Apply 3 oz. of complete fertilizer every yard, distributing it along the two corners of the drill in two narrow bands. Apply bone dust if available.

Place the tubers, out of contact with the

VEGETABLES

fertilizer, along the ridge, up to 18 in. apart. Fill in firmly.

At flowering time, hill the row to avoid exposure to moths and greening. Cultivate shallowly and water amply.

For storage, select only from disease-free plants. Store in shallow trays or boxes in a cool, ventilated, light shed. Choose only mature tubers with firm skins. Protect from moth attack with D.D.T. dust.

Pumpkins

See Cucurbits.

Ripen thoroughly before cropping or they will not keep. Leave the stalk attached. Pinch the trailers to encourage fruit setting and check unnecessary growth.

Leave three plants in each hill, 12 ft. between hills, and 12 ft. between rows. They mature in four to six months.

Radishes

Very easy to grow in well watered, well manured lighter soil. Avoid fresh manure, which causes forking and splitting.

Sow seed in permanent rows, 9 in. apart.

Sow thinly, $\frac{1}{2}$ in. deep. Germination is rapid, within four days. Apply complete fertilizer in drills in the usual way, 1 oz. per yard.

Thin to 2 in. apart after two leaves appear. They must be grown quickly, to avoid a strong flavour and woodiness. Keep moving with liquid manure. Keep well dampened. They mature in six weeks.

Rhubarb

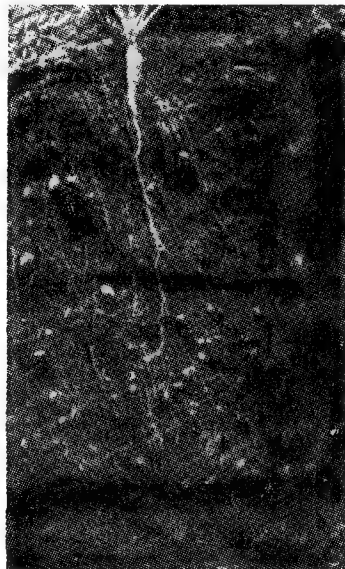
Although rhubarb can be raised from seed, crowns are easier to handle and can be readily obtained.

Choose a deeply drained, moist soil, very rich in organic matter. Trench deeply, adding to bottom of trench heavy quantities of all kinds of animal manure.

Before planting out, add fertilizer, superphosphate, ammonium sulphate, blood and bone (2:1:2), $\frac{1}{4}$ lb. per square yard.

Set them out 2 ft. apart, 3 ft. between rows. For a winter crop, set out in the autumn. Take only a few stalks the first season.

Manure each year as above. Re-establish the beds every three years. Cut off the flowering stalks. When cropping, do not cut, but pull with both hands.



Typical root systems, showing importance of deep, fertile soil.

VEGETABLES

Rockmelon (or Cantaloupe)

See Cucurbits.

Fruit setting often fails. Check this and hand pollinate, in broad daylight, when flowers are open.

Seed is slow to germinate. Sow up to a dozen, and thin out, three to each "hill," 6 ft. between "hills," 6 ft. between rows.

Ripeness is indicated by feel, when the end opposite the stem yields to slight pressure. Cracks also develop at the stem junction and they should break away with a slight pull.

Salsify (Vegetable Oyster)

A biennial plant, the roots resembling small parsnips and tasting like oysters. The salsify is most deserving of cultivation.

Light, deep, rich soil is ideal, as soil manured for a previous crop. Cultivation and requirements as for carrots.

Sow in permanent beds, 1 in. deep, in rows 15 in. apart. When 3 in. tall, thin out to 4 in. apart.

The roots take a long time to mature, up to 12 in. in cool districts. Dig when mature to prevent growth for the second year.

Sow preferably in early spring, and also in the autumn.

Shallots (Eschalots)—see Onion

Silver Beet

Is easy to grow. Light to medium soil, rich in organic matter, is ideal.

Prepare fertilizer drills 15 in. apart, 4 in. wide and 4 in. deep. Apply complete fertilizer, or a superphosphate-sulphate of ammonia mix (4:1) to the drill, 1 oz. per yard.

Sow seed in permanent drills 15 in. apart, directly above the fertilizer, 1 in. deep. Thin to 1 ft. apart.

Keep well watered. Must be grown quickly. Apply 1 oz. of sulphate of ammonia as a dressing each fortnight.

Spinach

Choose any moderately rich, well drained loam. Dig a week or so before hand, in-

cluding manure, or compost and complete fertilizer, 1 oz. per square yard.

Sow in rows 15 in. apart and $\frac{1}{2}$ in. deep. Firm the seed into the soil, covering with mulch, and keep well dampened.

Thin out to 8 in. apart; the close planting will help to keep the leaves from soil and grit.

Grow quickly, as for lettuce and silver beet, with side liquid dressings.

Sow every three weeks for a continuous supply. The first crop is ready in 12 weeks.

Squashes

See Cucurbits.

These require rich soil and plenty of organic matter. There are two main types:

WINTER SQUASH: Similar to Pumpkins. Have a running habit, and useful for storing. Varieties: Hubbard, Table Queen, Table Gem.

SUMMER SQUASH: Non running, more similar to marrows. Do not keep well after picking.

Swede Turnip—see Turnip

Sweet Corn

Deep rich soil, amply manured and copiously watered, is essential. It is a gross feeder, and almost impossible to over-feed.

Apply complete fertilizer, preferably superphosphate and ammonium phosphate (3:1), 1 oz. per yard of drill.

Sow after frost danger, in permanent rows, 12 to 18 in. between seeds, according to height of crop species. Form the rows into a block to assist in complete pollination. Sow two seeds together, and select the stronger seedling.

Top dress with potash fertilizer; rake and water in.

Pull cobs in soft, milky stage, when the silks are turning brown. Use almost immediately, or store in a refrigerator.

Sweet Potato

Raise in a similar way to potatoes, except for hilling. Choose light soil, enriched with organic matter. Apply fertilizer, pre-

VEGETABLES

ferably superphosphate, sulphate of ammonia, potash (3:1:1), $\frac{1}{4}$ lb. per 12 ft. of row. Avoid an excess of nitrogen.

To sow, first sprout tubers in the soil, until leaves on the runners appear above the soil. Cut off each runner, leaving about three nodes per runner. Set these out, with only the leaves showing, spacing to 18 in., $2\frac{1}{2}$ ft. between rows.

Shallow cultivation, especially for weeds. Water amply. The crop takes from four to eight months to mature. The tubers are ripe when the cut surface runners remain white and juice does not turn black.

Protect the vines from frost. This plant is regarded as a perennial or as an annual.

Tomatoes

All well drained and fertile soils are suitable. Dig well, adding well rotted organic matter, and leave to fallow if possible. Liming is not necessary.

Before transplanting (or planting), break down the soil to a fine tilth, adding complete fertilizer, 2-3 oz. per square yard, since all three main elements are needed to develop and ripen the fruit.

It is preferable to raise your own seedlings, since many virus diseases are soil borne. Sow in boxes.

Seed box soil should consist of equal parts of well rotted cow or horse manure and sand. Do not use poultry or nitrogenous fertilizer, since this induces sappy growth, damping-off disease, and failure to survive transplanting.

Seedlings can be raised before the cold or frosts end. Sow in deep boxes, covered with glass, $\frac{1}{4}$ in. to $\frac{1}{2}$ in. deep, set on a manure hot bed; or placed in warm shelter. Thin out to 2 in. apart.

When the stems are strong, at 6 in., transfer to the permanent bed, covering each with glass or a plant pot, and leave until recovered from the transplanting.

In warm summer, sow thinly in glass covered boxes, keeping the soil moist till germination. Cover the glass from the sun; harden off by raising the glass each day, finally for several hours.

When 2 in. high, transfer to glass covered deeper boxes, 4 in. apart. These boxes need good loam with a sprinkled superphosphate dressing. When 6 in. high,

harden by exposure to direct sun several hours daily.

TRANSPLANTING: Avoid disturbing the roots. Cut out each plant from the soil separately, leaving ample soil. Lift from below on a knife. Set firmly in a slightly larger hole; water the hole first.

Set at the same depth as in the seed box. Space $1\frac{1}{2}$ -2 ft. apart in rows 3 ft. apart. Take care to prepare for transplanting by properly hardening up first. Protect from sun with hessian, etc., until established.

If the seedlings to be transplanted (or planted) have grown long and spindly, lie them in a narrow drill, 2-3 in. deep, slantwise. Fill in. They will grow strongly erect.

A recent practice is to sow seed directly into permanent beds. To ensure complete germination, plant seeds in groups of four, spaced for mature plants. After germination leave one hardy seedling.

STAKING: Strongly advised for all varieties, excepting a few large fruited dwarf "bush" types and in the hot inland. Allow 4 ft. apart for the latter. Use strong stakes, 6 ft. high, driven to 18 in., at time of transplanting. Tie every 15 in. For method, see illustration, page 59.

PRUNING: Pinch out the lateral shoots on the main stem-leaf stalk junction. Pinch closely, without injuring, first pinching when plants 10 in. high. Don't pinch the growing top or the flower stalks, and leave foliage to prevent sun injury.

Watering is usually by the furrow irrigation method.

CULTIVATION: Tomatoes need uninterrupted care from sowing to fruiting: regular shallow cultivation for weeds; regular and ample watering. When a foot high, give each plant a side dressing of teaspoonful of complete fertilizer. Repeat when fruiting commences.

DISEASES: Tomatoes are readily susceptible to virus and fungus attack. From the day of transplanting (or planting), spray against spotted wilt and other wilts. Remove wilt infected branches, even the whole plant. Plant in new soil next season.

INSECT PESTS: Tomato grub, metallic fly, tomato mite.

VEGETABLES

Turnips

A well worked and manured, friable soil desirable. Prepare drills, 18 in. apart, with superphosphate, 1 oz. per yard, or include blood and bone. Compact the soil above and form furrows. Sow seed sparsely along these and press into the soil, no more than 1½ in. deep. Thin to 4 in. apart.

When the root begins to form, repeat the fertilizer dose as a side dressing. Weed, cultivate and water well.

Water Cress

Ideal position is on the water's edge of gently flowing streams or ponds; but also grows in easily flooded beds and in rich

garden soil in trenches, flooded each day until matured.

Watermelon

See Cucurbits.

Leave one plant per hill to produce large fruit. Water well, especially in the early stages, and fertilize well.

When ripe it will give a ring when tapped with the knuckles—otherwise a dull thud. The stalk will also be quite woody and no longer sappy.

Form hills 8 ft. apart, and 8 ft. between rows. They mature in 3½-4½ months.

Pinch the ends of the runners to encourage fruiting and prevent unnecessary growth.



A successfully grown marrow. Vine crops need constant and ample water in the early stages and limed, fairly richly fertilized soils. Sow after danger of frosts and keep down weeds in seedling stage.

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Herbs...

HERBS are valuable for many reasons apart from use in cooking. They repel some harmful insects, contain great medicinal properties and have a decorative and fragrance value — notably thyme, sage, lavender and rosemary, which can be used in sachets and pot-pourri. As popularity of Continental cooking in Australia increases they will be grown more.

With the exception of mint, which thrives in dampness, most enjoy a dry, sunny position and an average garden loam. Can be grown in a separate spot or make decorative edgings for vegetable beds.

In temperate climates seed is sown from September-December; in cool climates from March-May. New plants also obtained by dividing old clumps in spring and taking rooted pieces of young growth. Mint is always grown this way.

Sow seed in boxes, covering with sprinkling of soil about three times thickness of seed, and keep moist. When 3 in. high, transplant to permanent position, spacing plants 9 in. apart and rows 12 in. apart.

To dry, allow to bloom and hang upside down in shade. More quickly dried the better. Then crush and store in sealed bottles or jars.

Herbs usually grown are parsley, mint, thyme, sage, marjoram, chives.

PARSLEY (*Petroselinum crispum*): Sow seed in permanent position (resents transplanting and dislikes lime) in spring and autumn to guarantee a continuous supply.

Used for garnishing and flavouring; is vitamin rich; contains essential oils and drugs; crushed seed used as insecticide.

MINT (*Mentha piperita*): Grown by root division in spring. Very vigorous. Best confined to tinfol or tubful of soil near a tap. Don't allow to flower.

Used for garnishing and flavouring; treatment of digestive ailments; ingredient for perfume.

THYME (*Thymus vulgaris*), **SAGE** (*Salvia officinalis*), **MARJORAM** (*Marjorana hortensis*): All easily cultivated in a warm, dry spot. All have a strong flavour. Their discreet use in salads in place of vinegar is recommended, as they are more easily digested.

THYME: Cut bright green blossoming shoots for drying. Fruit-bearing shoots may be candied like crystallised fruit—a delicacy relished by vegetarians. Used in antiseptics and digestive oils.

SAGE (*Salvia officinalis*): Botanical name stems from "Salveo" ("I'm well").

Flavouring for meats, fish, poultry, game, sausages. Highly decorative; silver velvety leaves; blue or pink blossom. Great medicinal value.

CHIVES (*Allium Schoenoprasum*): Bulbs planted early spring. Clumps need breaking up and replanting only once in three or four years.

Used in seasoning for poultry, flavouring for salads. Contain less sulphur than onions and are more easily digested. Useful in poultry mash for chicks and young turkeys.

PAPRIKA (*Capsicum*) or Hungarian Paprika: An annual bush, 3 ft. high, with dark green leaves, yellow flowers, and shiny pods 5 in. long. Green pods can be pickled, or left to harden and redden before being ground into pepper. The flavour is milder than chillies. They require a sunny position and limed soil.

ROSEMARY (*Rosmarinus officinalis*): Has leathery, narrow, tough leaves and blue flowers. Fresh leaves have odour of turpentine, and are highly aromatic when dried, with a somewhat biting flavour. Most desirable in soups, meat and fish preparations.

MARJORAM (*Marjorana hortensis*): There are perennial and annual varieties. Annuals are to be preferred, and require shelter from snow and frost. Avoid overdamp soil and provide a sunny aspect. Cut before flowering, dry, and keep in an airtight container.

Storage and Preservation

. . . OF GARDEN PRODUCTS

AT various times throughout the year your garden will produce large quantities of food far in excess of immediate needs. Instead of wasting it, why not store or preserve it for future use? Green leafy types do not store satisfactorily for long periods, but may be successfully dehydrated. Cabbage, Brussels sprouts, beans and peas may be treated in this manner.

The method used in drying vegetables is simple and most successful. Vegetables for drying must be young, and should be processed as soon as gathered. Wash the vegetables thoroughly, taking care to remove all damaged portions. Green leafy vegetables may be cut up finely or dried whole.

Place the prepared vegetables in a muslin bag and plunge into boiling salted water—one teaspoonful of salt to each pint of water. Allow to blanch for from two to five minutes. To improve the colour of green vegetables, add one level tablespoon of baking soda to each gallon of boiling water. At end of blanching period drain thoroughly and spread out on a wire tray. See that goods are spread thinly and evenly to ensure even drying. Cover trays with muslin to protect from dust and flies. Place covered trays in the oven and dry until quite brittle and dry throughout.

Vegetables may be dried in the oven if so desired at a temperature of 140° F. Leave the oven door slightly open to allow the moisture to escape.

When quite dry, allow to become quite cold. Store in clean, dry, airtight jars.

To prepare for use, soak for 24-36 hours in cold water. Cook in soaking water. Simmer the goods when cooking.

Dried Onion Rings

Peel the onions and cut into rings half an inch thick. Blanch them by plunging into boiling water for three minutes, then lift out and plunge into cold water. After draining, the onion rings may be spread on drying trays which can be placed in the sun to dry. They may be dried in the oven at a temperature of 140° F. When crisp and dry, pack the onions in a clean, dry, airtight jar or tin.

Dry Salting of Beans

Green, fleshy beans are best for salting. Butter beans are quite unsuitable. Pick the beans on a day when they have not been watered. Do not wash. Wipe each bean with a clean dry cloth to remove all particles of dust and dirt. String the beans, and prepare as for cooking. Weigh the prepared beans and for each 1 lb. of beans allow $\frac{1}{4}$ lb. salt and one $\frac{1}{2}$ lb. of salt over.

Take a clean, dry vessel and place a layer of salt $\frac{1}{2}$ in. thick over the bottom of the jar. Then add a layer of beans; next add a thin layer of salt, then another layer of beans. This process is continued until the jar is filled to the top. Cover with a thick layer of salt. Place a clean cloth over the jar and store in a cool, dark, dry place. As the beans shrink, more beans and salt are added to the jar until it is quite full. When needed for use, remove the required quantity and wash very thoroughly in several changes of water. Place in a saucepan, cover with cold water, bring to the boil and pour off the water. Repeat this process twice. Finish cooking in the third water.

Surplus supplies of tomatoes may be stored for winter use in several ways. They may be pulped, bottled, made into a paste, tomato sauce, ketchup, chutney or pickles. In any form tomatoes are a pleasing adjunct to winter menus.

Pulping Tomatoes

Tomatoes may be pulped with a minimum of effort. They are simple to do,

METHODS

and occupy very little room in the store cupboard.

Tomatoes for pulping should be sound, showing no signs of decay. However, fully ripe fruit which is too soft for bottling may be used. Gather fruit and wash thoroughly. Remove skins by placing fruit in a cloth, plunging fruit into boiling water, allowing to stand one minute, then remove and plunge into cold water. The skins will then peel off with the greatest of ease.

Place prepared fruit in a pan; bruise slightly to commence flow of juice. Heat gently to boiling point, stirring frequently to prevent scorching. Boil rapidly with lid off the pan until the mixture is thick.

Prepare bottles — any type of cordial or sauce bottle may be used. Wash thoroughly and heat in the oven.

When the pulp is thick remove the hot bottles from oven, stand on a damp cloth, and fill with pulp. Fill the last half-inch of bottle with boiling water. Seal with sterilised corks or "Kork-N-Seal." Dip tops of bottles into melted paraffin. When quite cold, wash the bottles, label, and store in a cool, dark, dry place.

Tomato Paste

This is made by further dehydrating the pulp. Boil the pulp until it is very thick. Place on large, flat, shallow trays, cover with gauze and place in the sun or in a slow oven until a leathery sheet is formed. Cut the paste into squares or cubes, place in clean, dry, airtight bottles, and store in a dry place. Paste is very useful for flavouring sauces, gravies and soups.

To Bottle Tomatoes

Firstly, obtain your preserving bottles, examining carefully to see that they are free of chips, cracks and flaws. Wash the bottles very thoroughly in hot soapy water, rinse in cold water, stand on a clean, dry cloth and scald. Invert the bottles on a clean, dry cloth, and allow to remain until required. Prepare the lids and rings by washing thoroughly and standing in bowls. Cover with boiling water and allow to remain until needed.

Select only good, sound, ripe tomatoes; wash thoroughly and sort for size. Even-sized tomatoes will give the best results, as they will cook evenly. Remove the skins by plunging the tomatoes into boiling water for one minute. Lift out and place in cold

water. Skins will now lift off easily. The peeled tomatoes may be bottled in any of these ways:—*Firstly*, they may be packed whole into the jars and covered with brine made by adding one tablespoonful of salt to one gallon of water. Fill the jars to overflowing, add the rings, lids and clips, and sterilise at boiling temperature 212° F. for 35 minutes.

Second Method: Pack the jars tightly with tomatoes. Puddle with a knife to remove air bubbles and commence the flow of juice; add tomatoes until the jar is $\frac{1}{2}$ in. from the top. Under the last tomato place one teaspoon of salt and a quarter teaspoon of sugar to each quart jar. Fill the remaining $\frac{1}{2}$ in. space at top of the jar with cold water. Wipe the end of the jar to make sure it is clean and free from seeds, as particles will prevent the jar from sealing. Add the ring and lid, and sterilise at boiling temperature 212° F. for 35 minutes.

The Third Method is quick and simple. Place the peeled tomatoes in a saucepan and bring slowly to the boil; stir frequently to distribute the heat and prevent the fruit scorching. Stand the washed jars in the oven to heat. When quite hot fill the hot jars with the hot tomatoes; add one teaspoon of salt and a quarter teaspoon of sugar to each quart jar. Put on the rubber rings and lids, and place in sterilising vat and process at boiling temperature for 30 minutes. At the end of the processing time, lift from the sterilising vat and place on folded dry cloth on folded newspaper out of draughts. Allow to cool for 24 hours. At the end of the cooling period, test for seal, wash the jars and store in a cool, dark, dry place.

Beetroot

Beetroot is always useful in the home and a delightful addition to any cold meal. Beetroot may be stored quite successfully for several months. Pick the beetroot when in prime condition. Cut off the leaves, leaving 4 in. of stem. Pack the beetroot away in a box of clean, dry sand. Add a layer of sand and a layer of beetroot until the box is quite full, then cover with a thick layer of dry sand. When packing the beetroot, take care to see that each beetroot is entirely surrounded by sand. When needed for use, remove from sand, wash and cook in the same manner as fresh beetroot.

Carrots and parsnips may also be stored in this manner.

STORAGE AND PRESERVATION

Dried Apple Rings

In most home gardens we find an apple tree. Much of the fruit may be dried and stored for winter use.

Select apples free of blemish, wash and dry thoroughly. Peel thinly, remove the cores and cut into rings $\frac{1}{4}$ in. thick. In order to retain the lovely white freshness of the apples they must be sulphured. To sulphur the apples, hold a glass jar over a sulphur candle, or a little sulphur burned on coals, until the jar is full of gas and milky in appearance. Cover the jar with a saucer to prevent the gas from escaping. Slip the apple rings into the gas-filled jar; leave for 15 minutes. During this period shake the jar occasionally to see that all apples come in contact with the sulphur

fumes. Remove the rings, thread on a wire or stick, and hang in the sun to dry. The apple rings may be dried in the oven at a temperature of 180° F. When leathery in texture, pack the rings in an airtight container until required.

Lemons will keep for use when scarce if stored carefully. The lemons should be slightly under-ripe, and cut from the tree so that $\frac{1}{4}$ in. stem is left attached. Lemons for keeping should be in perfect condition and free from blemish. Smear each lemon with vaseline, taking care to see that the lemon is completely covered. When smeared with vaseline, wrap carefully in pieces of tissue paper. Pack the lemons loosely in a small ventilated box. Store in a cool, dark, dry place.

THE FOOD VALUE OF VEGETABLES

	Minerals			Vitamins		
	Calcium	Phosphate	Iron	A	B	C
Artichoke (Globe)	1	2	1	1	2	2
Asparagus	1	—	2	1	2	2
Beans—Haricot	2	2	3	—	2	—
Lima	2	3	4	2	2	—
French or String	2	1	2	2	1	2
Beetroot	1	—	1	—	2	1
Beet Greens	3	—	3	3	1	3
Brussels Sprouts	1	2	2	2	2	3
Cabbage	2	—	—	2	1	2
Carrots	2	1	1	4	2	2
Cauliflower	3	1	1	—	1	2
Celery	2	—	1	1	1	1
Cress (Garden)	—	—	—	3	2	3
Cucumber	—	—	—	—	1	2
Green Peppers	—	—	—	2	—	4
Leeks	2	1	1	—	1	2
Lentils (dry)	1	2	3	—	2	—
Lettuce	1	—	1	3	2	1
Mushrooms	—	2	1	—	2	—
Mustard Greens	—	—	—	3	1	4
Onions	1	1	1	—	2	2
Parsnips	2	1	1	1	2	2
Peas (Green)	1	2	3	2	2	2
Peas (Dried)	1	2	2	1	1	1
Potatoes	—	1	1	—	1	2
Pumpkin	1	1	1	1	1	1
Radish	1	—	1	—	1	2
Spinach	2	1	3	4	2	3
Swede Turnip	2	1	1	—	2	2
Tomatoes	—	—	—	3	1	2
Turnip (Root)	2	1	1	—	1	2
Turnip (Greens)	3	1	3	4	1	3
Water Cress	3	1	3	3	2	4

The figures represent an arbitrary grouping, 4 meaning a relatively high percentage, 3 less, etc.



PEAR
SCAB

Plant Diseases

CAUSED BY



MOTTLE
LEAF

- ★ FUNGI
- ★ BACTERIA
- ★ VIRUSES

ONE large group of plant diseases is caused by *fungi*—parasites that penetrate healthy plant-tissue and obtain their nourishment from it. They reproduce themselves by disseminating spores in very large numbers. Unfortunately, the effects of the attack are not seen until the fungi are well-established inside the living plant-tissue. The secret of control is to note appearance of disease at the earliest possible moment, and to apply control measures immediately. Better still, apply them before the disease appears.

A wide range of symptoms may indicate an attack by fungi. They include: Leaf spots, spotting of fruits, rotting of fruits, and root rots.

Leaf spots, stem decays and root rots may also be caused by *bacterial diseases*. The bacteria are extremely minute, and can be carried from plant to plant by rain splashings, by insects, or by the handling of diseased plants. *They carry over from season to season in infected seed, in soil, or in lightly-infested plant-tissue.*

Common diseases in this group are: Halo Blight (French Beans), Black Rot (Cabbage, Cauliflower), Bacterial Blight (Peas), Bacterial Stem Rot (Potatoes, Tomatoes), Bacterial Canker (Plums).

Virus Attacks Very Serious

Virus diseases form a very serious menace to plant life. Sub-microscopic organisms get right into the protoplasm of the living cells of the plant without actually killing them. They can also live and multiply within their plant hosts, and they multiply at the expense of their hosts.

Many of them are carried from plant to plant by sucking insects, aphids, leaf-hoppers and thrips. They can be transmitted through the seeds.

There is no known cure for a virus disease. Partial control is possible by attacking the insect-carriers with modern insecticides. Preventive measures, such as pulling up and destroying diseased plants immediately infection is noticed, will check spread of disease to healthy plants.

Virus diseases include: Spotted Wilt (Tomatoes), Mosaic (Cauliflowers, Broccoli and other crucifers), Leaf Roll (Potatoes), Greening (Antirrhinums and many other plants).

Some plant diseases are caused by *Nematodes*—small, round worms. These become very active parasites of plant-tissue, causing root nodules and seriously affecting the vitality of the plant. Control is extremely difficult. Soil sterilisation by heat or by chemicals is practised. Resistant types have been found in some crops (such as Tomatoes).

PLANT DISEASES

Sometimes the plant disease is due to a *physiological* cause. The plant is affected by something in its environment. There may be too little (or too much) of some mineral in the soil, or the trouble may be due to waterlogging or to drought.

Deficiency of boron in the soil, for example, can cause: Brown Heart (Turnips and Swedes), Brown Curd (Cauliflowers), Corkiness (Apples).

Diseases of Fruit Trees

ALMOND: Shot-hole, Rust, Freckle.

APPLE: Black Spot, Cork Disorders, Little Leaf, Powdery Mildew.

APRICOT: Brown Rot, Freckle, Shot-hole, Leaf Curl.

BANANA: Leaf Spot and Speckle.

CHERRY: Brown Rot, Shot-hole.

CITRUS: Black Spot, Brown Rot, Brown Spot (Mandarins), Collar Rot, Gummosis, Leaf Yellowing, Foliocellosis (Mottle Leaf) in inland areas, Melanose, Root Rot (Armillaria), Lemon Scab, Sooty Blotch, Septoria Spot.

GRAPE VINE: Black Spot, Downy Mildew, Powdery Mildew.

PASSION FRUIT: Brown Spot, Collar Rot, Sclerotinia Blight, Woodiness.

PEACH: Brown Rot, Freckle, Leaf Curl, Rust, Shot-hole.

PEAR: Black Spot, Fleck (see Apple).

PLUM AND PRUNE: Brown Rot, Rust.

QUINCE: Fleck.

VARIOUS FRUIT TREES: Root Rot, Wood Rot, Crown Gall.

Diseases That Attack Vegetables

BEANS: Halo Blight, Anthracnose, Rust.

BROAD BEANS: Spotted Wilt, Rust.

CABBAGE: Downey Mildew, Magnesium Deficiency, Club Root.

CAULIFLOWER AND BROCOLLI: Whiptail, Downy Mildew, Magnesium Deficiency, Club Root.

CARROTS: Virus Disease, Powdery Mildew, Downy Mildew.

CELERY: Leaf Spot.

CUCUMBER: Mildew.

LETTUCE: Spotted Wilt.

MARROW AND SQUASH: Powdery Mildew.

MELONS: Powdery Mildew, Downey Mildew, Fusarium Wilt.

ONIONS: Downy Mildew.

PEAS: Foot Rot, Pod and Leaf Spot, Seed Rotting, Pre-emergence, Damping-off.

POTATOES: Irish or Late Blight, Virus Diseases.

PUMPKINS: Powdery Mildew.

SILVER BEET: Leaf Spot.

STRAWBERRY: Strawberry Crinkle, Leaf Spot, Leaf Scorch.

TOMATOES: Tomato Wilt, Leaf Spots, Blossom End Rot, Blossom Drop.

Diseases That Affect Flowering Plants

ASTER: Black Leg.

CARNATION: Mildew.

CHRYSANTHEMUM: Rust on leaves, Leaf Spot.

CINERARIA: Rust on leaves.

DAFFODIL: Daffodil Mosaic.

DELPHINIUM: Black Spot.

HOLLYHOCK: Rust on leaves.

GLADIOLI: Botrytis Soft Rot of Corm, Septoria Spot, Sclerotinia Dry Rot, Gladiolus Mosaic.

ROSE: Mildew on leaves, Orange Rust, Black Spot.

SNAPDRAGON: Greening.

SWEET PEA: Wilting.

SHASTA DAISY: Rust on leaves.

PETUNIA: Greening.

HOW TO IDENTIFY AND CONTROL PLANT DISEASES

Anthracnose

Fungus disease that causes veins of bean leaves to appear blackened. Pods and stems may show brownish, sunken cankers. Seeds in pod may be affected.

CONTROL MEASURES: See Septoria Spot.

Bacterial Pit of Lemons

Sunken black areas ($\frac{1}{2}$ to $\frac{3}{4}$ in. diameter) develop in skin of fruit of lemon tree.

CONTROL MEASURES: At blossoming, after half (but before all) the blossoms have shed their petals, spray with Bordeaux mixture 6:4:80 (plus $\frac{1}{2}$ gal. White Spraying Oil). Apply again in January or February.

Blackheart

Physiological disease that causes brownish to black discolouration of celery leaf margins and veins of young leaves of heart.

CONTROL MEASURES: Neither dusting nor spraying effective. Uniform soil moisture should be maintained. Avoid over-irrigation.

Black Leg

Fungus disease that causes brownish, sunken cankers on stems of cabbages near soil level. Circular brown spots may also occur on leaves.

CONTROL MEASURES: Rotate members of cabbage group with other crops.

Black Spot of Apples and Pears

Fungus disease attacks fruit and leaves of apple trees. On the fruit they form dark green (often circular) velvety patches. Generally cause fruit to crack. On leaves they appear as round or oval spots.

CONTROL MEASURES: At green tip stage spray with Bordeaux mixture 15:15:100 (plus $\frac{1}{2}$ gal. white or pale spraying oil as spreader and sticker). If it is desired to apply strong lime-sulphur (for scale insects, mites, red spider or powdery mildew) this should not replace Bordeaux mixture, but could be used as a supplement. At spur burst stage spray with Bordeaux mixture 15:15:100, plus $\frac{1}{2}$ gal. oil. At pink stage use lime-sulphur 1:40. Calyx spray is parti-

cularly important, and should be timed on earliest rather than latest blooms. Calyx-stage spray is lime-sulphur 1:80 to 1:100. At intervals of about three weeks from calyx to harvest (according to weather conditions) use lime-sulphur 1:80 to 1:120.

For pears, sprays recommended are: At green tip stage and at spur burst stage, Bordeaux mixture 15:15:100, plus $\frac{1}{2}$ gal. oil. At white stage, lime-sulphur 1:40. At calyx stage, colloidal sulphur (1 to 2 lb per 100 gal. water) or wettable sulphur (3 to 5 lb. per 100 gal. water). Do not apply lime-sulphur to pears at calyx stage because of risk of injury.

Black Spot of Orange and Lemon

Fungus disease, which causes round, sunken spots on the fruit. Spots are dark brown, and in the centre are minute, black, punctiform pustules, visible to the naked eye.

CONTROL MEASURES: Spray when most of blossoms have fallen (and five, 10 and 15 weeks later) with Bordeaux mixture 1 $\frac{1}{2}$:1 $\frac{1}{2}$:80 (plus $\frac{1}{2}$ gal. white spraying oil as an adhesive). Or when most of the blossoms have fallen (and six and 12 weeks later) spray with Bordeaux mixture 2:2:80 (plus $\frac{1}{2}$ gal. white spraying oil). These sprays should be followed by a two-spray oil programme for scale control (never by soda sprays).

Black Spot of Vine

Fungus disease, spores of which are always present. Disease spreads rapidly when conditions are favourable for incubation and growth and causes considerable loss. Disease seldom appears in dry season.

CONTROL MEASURES: When buds are bursting, spray with Bordeaux mixture 6:4:40. When later buds are bursting, spray with Bordeaux 6:4:50. Spray subsequently if weather conditions favour development of disease. Do not spray during blossoming unless weather conditions favour disease.

Blight, Ascochyta

Fungus disease that attacks peas. Most severe in wet winters. Causes brown to purplish irregular spots on pods and leaves. Blackish-purple streaks occur on stems, which may rot. Plant yellows and dies.

CONTROL MEASURES: No cure for this disease, which is seed-borne. Clean

PLANT DISEASES

seed essential. Reject any that is discoloured, cracked or shrivelled. Burn diseased vines. Avoid over-watering in early stages of growth. Do not plant on land previously carrying diseased pea crop.

Blight, Early

Fungus disease that causes small yellow to greyish spots (without black specks) on celery. On potatoes, brownish round spots develop concentric rings. Spreads rapidly in wet weather. Disease also attacks tomatoes.

CONTROL MEASURES: Same as for Blight, Late.

Blight, Halo

Very serious bacterial disease that affects beans. It is seed-borne, and no cure is known. Leaves show brown spots, often with wide yellowish-green border, or "halo." Water-soaked patches occur on pods, and plants become defoliated, wilt, and die.

CONTROL MEASURES: Use only certified, disease-free seed. Reject any seed showing "blisters."

Blight, Late

Fungus disease that causes circular yellow spots on leaves of celery. Later spots turn brown, with tiny black specks. On potatoes, large water-soaked areas develop on leaf margins. Lower leaf surface has white mildewed appearance. Disease also attacks tomatoes.

CONTROL MEASURES: Spray with copper oxide, prepared Bordeaux, or wettable sulphur at seven to ten-day intervals. Or dust with copper oxide or Bordeaux (or sulphur, if other materials not available).

Blight, Sclerotinia

Attacks passion fruit vines.

CONTROL MEASURES: Remove and burn diseased laterals. Keep growth of vine as open as possible.

Blossom End Rot of Tomatoes

Caused by sudden fluctuation of amount of soil water available to plant at fruiting time. Plants in exposed situations more liable to be affected. Blossom end of fruit develops a water-soaked area which later becomes brownish, leathery and sunken.

CONTROL MEASURES: Minimise losses by judicious applications of water and early application of mulch (or well-rotted animal manure) to surface of soil.

Brown Rot

Very serious fungus disease which attacks twigs, blossoms and fruit of peaches, plums, and other stone fruits. Blossom attack looks like frost injury. On the fruit, the infected area spreads in concentric rings, which consist of millions of spores. Blossoms provide entry for spores.

CONTROL MEASURES: Destroy mummified fruit. For peaches and plums, at late bud swell (pink) spray with Bordeaux mixture 15:15:100, plus $\frac{1}{2}$ gal. oil. At blossoming, when most blossoms have fallen, spray with lime-sulphur 1:120 to 1:160. In the case of early maturing coastal varieties, use colloidal sulphur (2 lb. to 100 gal.) or wettable sulphur (3 to 5 lb. to 100 gal.). Spray also at shockfall and at intervals of three to four weeks from shockfall until fruit is harvested. For apricots, use Bordeaux mixture 15:15:100, plus $\frac{1}{2}$ gal. oil, when buds are swelling, and Bordeaux 2:2:100, plus $\frac{1}{2}$ gal. white oil, at five to seven-day intervals from early blossom to fruit set. For citrus, spray in early April before (or immediately after) the first autumn rains with Bordeaux mixture 3:3:80 (plus $\frac{1}{2}$ gal. white spraying oil). Spray also soil under trees.

Brown Spot of Citrus (Mandarins)

CONTROL MEASURES: Avoid severe pruning or beheading. Cut out diseased twigs and open up tree sufficiently to permit free circulation of air and rapid drying out of moisture. Thin out crowded limbs and inside growth.

Collar Rot

Causes bark of citrus trees near ground level to die. Later bark dries out and splits. Usually accompanied by copious development of gum.

CONTROL MEASURES: Cut away diseased parts carefully with sharp knife. Expose tops of main roots if necessary. Paint wound with Bordeaux paint or Stockholm tar. For attacks on passion fruit, attend to drainage if necessary. Keep soil pulled away from butts of vines. Expose roots for 3 to 4 in. from main stem.

Corkiness (or Brown Heart) of Apples

Physiological disease that makes centre of fruit brown. Due to lack of boron.

PLANT DISEASES

CONTROL MEASURES: As soil dressings in early spring apply $\frac{1}{2}$ to 1 lb. borax per fully-grown tree. Smaller amounts should be applied to young trees. Distribute evenly around each tree.

Damping-off

Results from attacks by micro-organisms present in soil and at soil surface. Affected plant seedlings fail to develop. Attack may come before seedlings emerge or after they do appear. Unmistakeable sign of damping-off after seedlings have emerged is small diameter of plant stem near surface of soil. Note if plants topple over or stems (near soil surface) have water-soaked look.

CONTROL MEASURES: Do not overcrowd seedlings; sow thinly and preferably in rows. Avoid over-watering. If soil is unsterilised, dust seeds before sowing with copper oxychloride or organic mercury compounds. Spray seedlings weekly (from time of emergence until transplanting) with Bordeaux mixture (3 oz. bluestone and $1\frac{1}{2}$ oz. quicklime in 5 gal. water) or with copper oxychloride (1 oz. in 2 gal. water). If disease appears, spray immediately and repeat at intervals of three to four days. Most satisfactory method of control is to sterilise soil of seedboxes. Heat kerosene tin of soil over a fire (or in oven) for about an hour. Discard any burnt soil.

Downy Mildew

Fungus disease, mainly of seed-bed stage. Leaves develop pale green or yellowish speckled markings, and a fluffy white mould appears on the undersides. Growth is checked, the leaves shrivel and plants may die. Downy mildew of vine occurs in spring through over-wintering spores being splashed up by rain. These spores retain vitality for a year.

CONTROL MEASURES: Spray the seedlings when they are 1 in. high with Bordeaux mixture 1:1:10 and repeat weekly. Apply a fine spray horizontally, so as to wet undersides of leaves. Bordeaux mixture may also be used to combat downy mildew on lettuce (greyish patches on leaves) and cucumbers (powdery spots that cause leaves to wilt and turn yellow). For squashes, marrows and pumpkins, dust with sulphur. For downy mildew of vine, spray with alkaline copper soda when vine shoots have grown eight to ten leaves. If weather conducive to fungus growth, spray every seven days.

Erinose

Attacks grape vines and walnut trees. Raised lumps develop on leaves, hairy on undersides.

CONTROL MEASURES: Just before bud-burst spray with lime-sulphur (3 pts. to 4 gal. water).

Fleck of Pears

CONTROL MEASURES: See Black Spot of Pear.

Freckle

Fungus disease that attacks apricots and peaches.

CONTROL MEASURES: For mid-season types (ripening about early January) spray with Bordeaux mixture 15:15:100, plus $\frac{1}{2}$ gal. white spraying oil, at late bud-swell (pinkish). Six to seven weeks later apply lime-sulphur (1 in 160) or colloidal sulphur (2 lb. to 100 gal. water) or wettable sulphur (3 to 5 lb. to 100 gal. water).

Fusarium Wilt (Root Rot)

Fungus disease that attacks plants through roots. Red or pinkish discolouration of roots and stem below ground level occurs, and plant wilts and dies. Many crops affected, especially tomatoes and beans.

CONTROL MEASURES: Remove infected plants and burn. Do not plant on soil previously growing infected plants. Disease encouraged by wet soil. Spraying or dusting useless, as organism is in soil and attacks within root tissue.

Leaf Curl of Peach

Fungus disease that causes first-formed leaves to thicken, pucker and discolour. They soon drop off and gumming often occurs. Fungus seems to winter in buds.

CONTROL MEASURES: When buds are swelling, but before pink of blossom appears, spray with Bordeaux mixture 15:15:100, plus $\frac{1}{2}$ gal. oil (or lime-sulphur 1:20). Essential to apply this spray thoroughly at early stage of bud-swell. Tar distillate ovicides reduce the amount of leaf curl infection, but are less effective than Bordeaux mixture or lime-sulphur. Similar control for apricots.

Leaf Spot and Speckle of Bananas

CONTROL MEASURES: Spray with copper oxychloride ($1\frac{1}{2}$ lb. to 40 gal.) or

PLANT DISEASES

Bordeaux mixture 4:4:40 (plus a good wetting agent). Add 1 lb. colloidal sulphur to each 40 gal. of spray. Apply at monthly intervals from November to March to plants which will bunch during January to May. At February and March applications include plants which will bunch during winter. Apply spray to undersides of three youngest leaves and to heart leaf.

Lichens

Greenish-yellow scaly growths that affect all deciduous fruit trees. Mainly occurs in wetter districts.

CONTROL MEASURES: Spray in winter with lime-sulphur ($3\frac{1}{2}$ pts. to 4 gal. water). Use tar distillate or D.N.C. (1 pt. to 4 gal. water).

Mosaic

Virus disease that causes mottling and sometimes stunting of cabbage leaves. Lettuce leaves acquire a light and dark green mosaic pattern. Bean leaves get crinkled, puckered and mottled.

CONTROL MEASURES: Rotate cabbages with other crops. Keep aphids controlled and keep weeds down. Do not save seed from diseased plants.

Mottle Leaf of Citrus

Due to zinc deficiency. Leaves are mottled, area along midrib and veins normal, remainder light yellow to white.

CONTROL MEASURES: Spray with zinc sulphate (6 oz., plus hydrated lime 3 oz. to 4 gal. water). Apply in September or March.

Powdery Mildew

Serious fungus disease, which attacks leaves, shoots, blossom-buds and fruits of apples and pears. Leaves and buds become covered with glistening white masses. Fruit is disfigured and small.

CONTROL MEASURES: In winter cut out and burn badly mildewed twigs and terminal buds. At early green tip stage spray with lime-sulphur 1:20. Lime-sulphur 1:80 to 1:120 can also be used with cover sprays of lead arsenate (use lime casein spreader).

Powdery Mildew of Vine

Fungus disease of grape vine. All green growing parts are covered with a very fine dusty film, which becomes greyish and has

mouldy smell. If infestation bad, young canes dry, leaves become deformed and brittle and fall.

CONTROL MEASURES: Dust (in early morning) with sulphur, or spray with colloidal sulphur (2 to 3 lb. per 80 gal. water). Apply when shoots are about 9 in. long. Apply at intervals of about 10 days during moist, humid weather.

Root Rot (*Armillaria mellea*)

Destructive root fungus. Attacks all fruit trees and many garden plants.

CONTROL MEASURES: Cut out and burn all diseased roots. Remove soil from butt and main roots 2 ft. all round. Apply Bordeaux paint to cut surfaces of roots. Dress soil with iron sulphate and quicklime before replanting.

Rust of Beans

Fungus disease that attacks climbing varieties. Small dark-coloured spots appear on leaves. Disease also attacks celery and parsnips.

CONTROL MEASURES: Spray with Bordeaux mixture.

Rust of Peach and Prune

Fungus disease that attacks peaches, plums and prunes. Small yellow spots appear on upper surface of leaves. On the underside raised brown pustules discharge spores. Circular green depressions on fruit. Leaf injury means poor crop next season.

CONTROL MEASURES: For peaches in coastal districts, spray at bud swell with Bordeaux mixture 15:15:100, plus $\frac{1}{2}$ gal. oil (or lime-sulphur 1:20). About four weeks after petal fall use colloidal sulphur (1 to 2 lb.) or wettable sulphur (3 to 5 lb. per 100 gal.). For peaches in tableland and inland districts, spray at bud swell with Bordeaux mixture 15:15:100, plus $\frac{1}{2}$ gal. oil (or lime-sulphur 1:20). In mid-October and in mid-December, use lime-sulphur 1:160 or wettable sulphur (3 to 5 lb. per 100 gal.). For Murrumbidgee irrigation area only use Bordeaux mixture 15:15:100, plus $\frac{1}{2}$ gal. oil, at bud swell, and Bordeaux mixture 2:2:100, plus $\frac{1}{2}$ gal. oil, in mid to late October and mid to late December. Use similar treatment for plums and prunes.

Septoria Spot

Disease causes small to large dark brown spots in skin of fruit.

PLANT DISEASES

CONTROL MEASURES: For citrus in inland areas, spray in March before autumn rains with Bordeaux mixture $2\frac{1}{2}$: $2\frac{1}{2}$:100 (plus $\frac{1}{2}$ gal white spraying oil). If it is desired to combine Septoria Spot spray with zinc spray for mottle leaf, use zinc Bordeaux 5:1:4:100 (plus $\frac{1}{2}$ gal. white spraying oil). Another spray is copper oxychloride, 1 lb. per 100 gal (plus $\frac{1}{2}$ gal. white oil). If tomato leaves are affected, dust with copper dust or spray with Bordeaux mixture.

Shot-hole

Fungus disease which attacks blossoms, leaves, twigs and sometimes fruit of apricot, cherry, plum and other trees. Blossom infection looks like frost injury. Leaf infection occurs very early, often reducing leaves to skeletons. Gum often exudes from ruptured bark. Scabiness appears on apricots.

CONTROL MEASURES: For apricots, spray in autumn as final leaves are falling with Bordeaux mixture 15:15:100, plus $\frac{1}{2}$ gal. oil. Spray again in early spring at pink bud stage. Use similar sprays on cherry and peach trees.

Sooty Mould

Disease associated with scale insects. Causes dense black powder on leaves and fruit of citrus trees.

CONTROL MEASURES: In early May apply lime-sulphur 1 in 40 or Bordeaux mixture 3:3:80 (plus $\frac{1}{2}$ gal. white spraying oil). Black spot spray programme for Valencia oranges will control sooty mould without further application in autumn.

Spotted Wilt

Serious disease of early tomatoes. Caused by a virus transmitted by thrips. Glistening bronze spots develop on leaves, which

blacken and shrivel. Fruit frequently shows circular blotches. Plants wilt and generally die. When broad beans are attacked, infected areas show large dark brown spots and streaks. If plants do not die they will be small and leaves will be mottled dark and light green, with rolled margins.

CONTROL MEASURES: Prevent disease by killing thrips with D.D.T. spray (0.1%) applied weekly (preferably twice weekly). Begin spraying in early seedling stage. Completely cover upper surface of plant. Pull out infected plants and burn.

Woodiness of Passion Fruit

Causes leaves to be small, mottled and distorted. Fruit becomes hard and woody.

CONTROL MEASURES: No controls. Remove and burn diseased vines. Do not prune vines until spring. Make certain soil is fertile and well-drained. Use heavy dressings of complete fertiliser or animal manure. Choose warm site, well protected from winds. Plant only healthy seedlings.

Wood Rot

CONTROL MEASURES: When reworking pome fruit trees, they should not be cut back to wood thicker than $1\frac{1}{2}$ in. diameter. Insert strap graft at top of limb and refurnish rest of branches with side grafts. In case of stone fruits, insert buds instead of grafts. Spray with Bordeaux mixture 6:6:22 when trees are dormant as a preventive.



Blossom end rot of tomato fruit.



Bean rust on under side of pale green bean leaf. Resistant, or partially resistant, varieties should be used when the disease is troublesome.

PLANT DISEASES



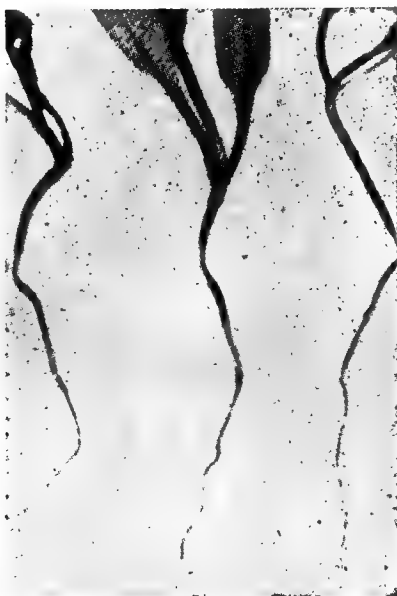
Late blight on celery leaf. Leaf diseases of celery are common in Hawaii.



Leaf spot disease of egg plant.



Tomato leaf showing tomato mosaic, virus disease. Note light and dark green pattern.



Damping-off disease is shown on these young chard plants.

Insect Pests . . .

that Chew Plant Leaves or Suck the Sap

TRY to keep your plants and your fruit trees healthy. For it is the most healthy growths that have built up resistance and are the last to go down under an onslaught of pests and diseases. So make sure that your soil is healthy, too; that it is naturally fertile. However, be ready to deal with insect pests or diseases immediately they arrive.

You can separate your insect pests into two groups — chewers (or biters) and suckers. Because their methods of feeding are different, you must attack them with different weapons.

It is no use trying to kill sucking insects with a stomach poison spread on plant leaves. For they dodge your poison by sticking their long, pointed beaks beneath the leaf surface, and suck the unpoisoned juice with relish. To kill the sucker you must use a contact insecticide (such as oil, soap, sulphur, sulphur compounds, nicotine and nicotine sulphate, pyrethrum, derris dust or D.D.T.).

But if a chewing insect starts biting a leaf on which there is a film of stomach poison it will get a fatal meal. For the poison, as well as the chewed leaf-tissue, enters the insect's stomach. Stomach poisons include:

LEAD ARSENATE: Widely used as arsenical spray on foliage.

CALCIUM ARSENATE: Used widely in baits and also as sprays.

CRYOLITE: Used particularly on citrus trees.

TARTAR EMETIC AND FLUOSILICATES: Used in bait sprays for flying insects.

SUCKING INSECTS include: Aphids (Green Peach, Black Peach, Black Cherry, Mite, Pear Leaf Blister Mite), Thrips, Leaf-hoppers, Scale Insects, Bugs (Green Earth Mite, Red Spider, Bryobia Mite, Pea Cabbage, Woolly), Mites (Red-legged Vegetable, Harlequin, Rutherglen).

CHEWING INSECTS include: Moths (Codling, Apple, Peach, Grape Vine, Tomato, Potato), Cabbage White Butterfly, Beetles, Borers, Slugs, Worms, Wireworms, Fruit Fly.

FUNGUS DISEASES in plants are caused by minute plants that live as parasites on living matter, and deprive the host plant of its nourishment. Spraying with fungicides prevents disease developing and affecting uninfested parts of the tree or plant. But once the plant is attacked the disease cannot be cured.

Fungus diseases include: Mildew, Leaf and Fruit Spots, Rots, Blight and Scab.

INSECT PESTS OF FRUIT TREES

ALMOND: Aphids, Red Mite, San Jose Scale.

APPLE: Leaf-hopper, Codling Moth, Fruit Fly, Root Borer, Mussel Scale, Red Mite, Red Spider, San Jose Scale, Thrips, Woolly Aphids.

APRICOT: Brown Scale, Frosted Scale, Fruit Fly, Leaf-eating Beetles, Rutherglen Bug, San Jose Scale.

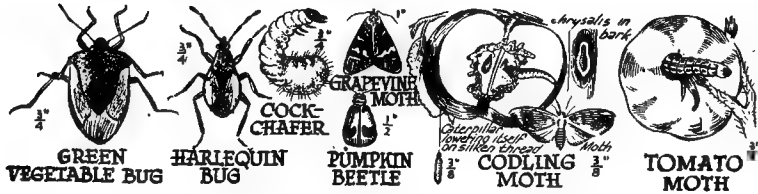
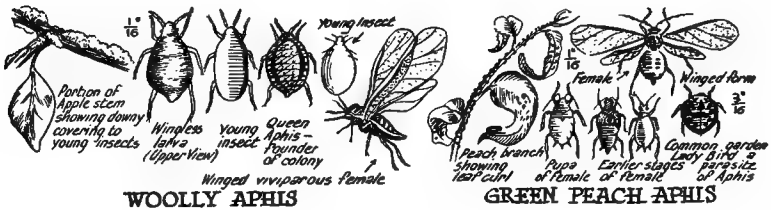
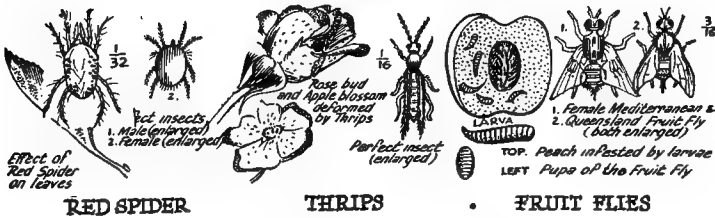
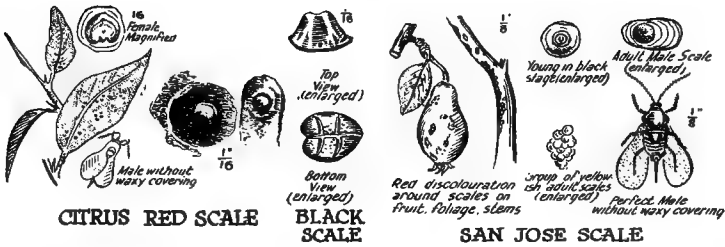
BANANA: Aphids, Beetle Borer, Red Spider, Thrips.

CHERRY: Cherry Aphids, Fruit-tree Moth

Borer, Pear and Cherry Slug, Rutherglen Bug, San Jose Scale.

CITRUS: Aphids, Black Thrips, Bronze Citrus Bug, Brown Scale, Citrus Butterflies, Citrus Bud Mite, Dicky Rice Weevil, Elephant Beetle, Fruit Fly, Fruit-tree Moth Borer, Fuller's Rose Weevil, Gall Wasp, Green Tree-hoppers, Longicorn Borers, Pink Wax Scale, Purple Scale, Rust or Silver Mite, Rutherglen Bug, Snails, Soft Brown Scale, Spiny Lemon Bug, White Wax Scale, White Louse, Yellow Monolepta Beetle.

INSECT PESTS



Some common garden pests often encountered in Australian gardens.

INSECT PESTS

FIG: Brown Scale, Fig-leaf Beetle, Fig Mite, Soft Brown Scale.

GRAPE VINE: Grape Vine Mealy Bug, Grape Vine Moth, Grape Vine Scale, Vine-berry Mite, Vine-leaf Blister Mite.

LOQUAT: Fruit Fly.

NECTARINE: See Peach.

PASSION FRUIT: Brown Scale, Fuller's Rose Weevil, Leaf-hopper, Rutherglen Bug.

PEACH: Black Peach Aphid, Brown Scale, Cutworms, Fruit Fly, Fruit-tree Root Borer, Inland Tree-hopper, Peach Tip

Moth, Red Mite, Red Spider, Rutherglen Bug, San Jose Scale.

PEAR: Pear-leaf Blister Mite, Pear and Cherry Slug. (See under Apple for other pests of Pears.)

PERSIMMON: Fruit Fly, Persimmon Root Mite, White Wax Scale.

PLUM AND PRUNE (English and Japanese): Frosted Scale, Fruit Fly, Fruit-tree Moth Borer, Pear and Cherry Slug, Red Mite, Red Spider, San Jose Scale.

QUINCE: Brown Scale, Codling Moth, Fruit Fly, Peach Tip Moth, Pear and Cherry Slug, San Jose Scale.

INSECT PESTS OF VEGETABLES

ALL CROPS: Aphids (Blight), Cutworms, Green Vegetable Bug, Harlequin Bug, Pea Mite, Red-legged Earth Mite, Rutherglen Bug.

MANY CROPS: Slugs and Snails.

BEANS: Red Spider.

BROCCOLI: Cabbage White Butterfly, Cabbage Moth.

CABBAGE AND CAULIFLOWER: Cabbage White Butterfly, Cabbage Moth.

CARROTS: Aphids, Lucerne Flea.

CUCURBITS (Melons, Cucumbers, Marrows, etc.): Red Spider.

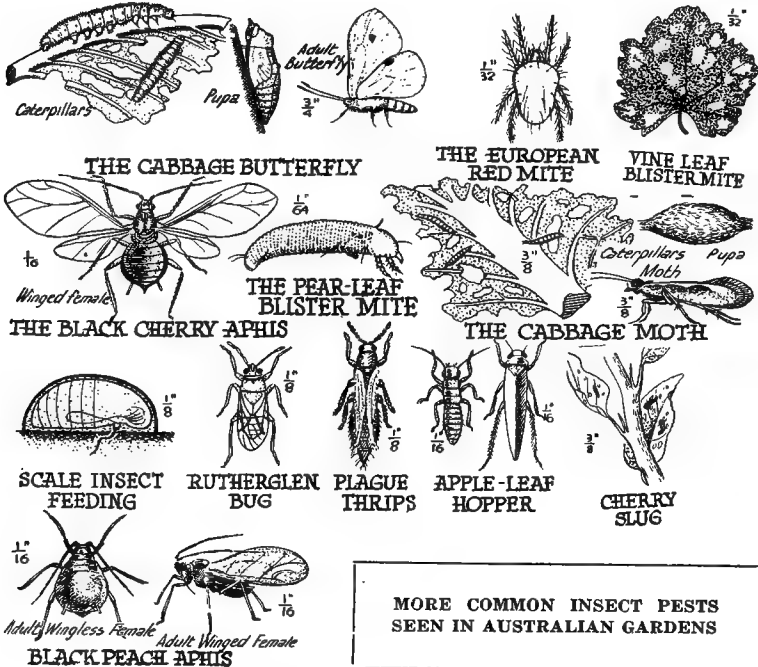
KALE: Cabbage White Butterfly, Cabbage Moth.

POTATO: Potato Tuber Moth.

RADISH: Cabbage White Butterfly, Cabbage Moth.

TURNIP: Cabbage White Butterfly, Cabbage Moth.

TOMATO: Tomato Moth, Green Vegetable Bug, Potato Tuber Moth.



MORE COMMON INSECT PESTS
SEEN IN AUSTRALIAN GARDENS

INSECT PESTS

HOW TO IDENTIFY AND CONTROL INSECT PESTS

Aphids, Black Peach (*Anuraphis persicae*-niger)

Sucks juice from branches and leaves of peach and nectarine trees. Search on leaves for small black or green insects. They cause leaves to curl and dry up.

CONTROL MEASURES: Before buds burst, use spray of D.D.T. in semi-dormant oil (1 in 40). When aphids first observed use D.D.T. emulsion (0.1%), but do not use D.D.T. when trees are in bloom. H.E.T.P. ($\frac{1}{2}$ pt. to 100 gal. water) is also effective, but is not compatible with Bordeaux mixture or lime-sulphur. As late as possible before buds burst, spray with nicotine sulphate (40%), 1 pt. to 75 gal. water, plus $\frac{3}{4}$ gal. white oil emulsion or lime-sulphur. If lime-sulphur is used as fungicide, combine nicotine sulphate with it, but omit oil and add 1 lb. calcium caseinate to each 75 gal. of combined spray. Both nicotine sulphate and H.E.T.P. give good control, but repeated applications may be needed to prevent re-infestation.

Aphids, Green Peach (*Myzus persicae*)

Wingless females (up to tenth of inch long) found on peach and nectarine trees in spring. They are oval, shiny, and vary in colour from green to pale yellow or pink. Have long legs and feelers. In early summer winged forms are produced. These migrate to secondary hosts (dahlia, dock, iceland poppy, pea, potato, rose, spinach, sow thistle, tomato, cabbage, cauliflower, radish) where hordes of wingless females are produced in summer and autumn. In late autumn winged forms again develop and fly back to fruit trees, where they lay tiny, shiny black eggs at base of buds. They carry many virus diseases, such as leaf roll of potato, from infected to healthy plants.

CONTROL MEASURES: Spray tar-distillate (1 in 40) before mid-July on roses, flowering peaches, plums, and almond trees. Essential to apply before buds burst. This spray kills over-wintering eggs and generally obviates need for spring sprays. D.N.C. oil (1 in 40) can also be sprayed at dormant period. At late bud-swell use D.D.T. in semi-dormant oil (1 in 40) or D.D.T. emulsion (0.1%). When aphids first observed, use H.E.T.P. ($\frac{1}{2}$ pt. to 100 gal. water). After eggs have hatched use nicotine sulphate (40%), 1 pt. to 75 gal. water,

plus 3 lb. soap to 75 gal. of spray. If lime-sulphur is used as fungicide, combine nicotine sulphate with it, but omit soap and add 1 lb. calcium caseinate to each 75 gal. of combined spray.

Aphids, Woolly (*Eriosoma lanigera*)

Sucks juice from apple and pear trees. Detected mainly by a white downy appearance on twigs and branches. Look for clusters of small insects with white sticky threads.

CONTROL MEASURES: Spray forcibly with nicotine solutions, white oil in summer, and red oil (2 pts. to 4 gal. water) in winter. For nicotine sulphate (40%) spray, use 1 pt. to 75 gal. water, plus $\frac{3}{4}$ gal. white oil emulsion. This spray may be combined with lead arsenate sprays used for codling moth. H.E.T.P. ($\frac{1}{2}$ pt. to 100 gal. water) can be used in spring or as needed. Must be mixed with neutral spreader. Effective under cool conditions.

Apple Mussel Scale (*Lepidosaphes ulmi*)

Attacks fruit of apples, pears, plums and other fruits. Absorbs sap and disfigures fruit. Will encrust trunk and main stems of tree if not checked.

CONTROL MEASURES: During winter spray with miscible red oil (1 in 25) or lime-sulphur (1 in 15). Use white oils or nicotine solutions in summer.

Apricot Beetle (*Belus* sp.)

Small destructive beetles. Have tapering body. Do great damage by boring and tunnelling into apricot trees.

CONTROL MEASURES: When fruit is in immature stages, spray with lead arsenate powder ($1\frac{1}{2}$ lb., plus fresh hydrated lime $1\frac{1}{2}$ lb. to 50 gal. water). D.D.T. spray (0.1%) can also be used.

Banana Beetle Borer

CONTROL MEASURES: Apply Paris green 1 part, flour 20 parts by weight. D.D.T. dust (2%) may be used. Spent stems must be cut off 6 in. above ground level and severed stem split lengthwise into at least four pieces. Remaining 6 in. stem is cut off at ground level and lower surface dusted with D.D.T. dust (1%), plus

INSECT PESTS

B.H.C. dust (1%). Cut surface of corm is also dusted. Replace 6 in. portion of spent stem on corm so that dusted surfaces are together.

Black Scale

(See Brown Scale)

Bronzy Orange Citrus Bug (*Rhoecocoris sulciventris*)

Sucks sap from citrus flowers, young fruit and stalks, causing them to fall. Also ejects foul-smelling liquid which causes leaf-burn. Winged adults are reddish-brown (with bronze sheen) and about 1 in. long.

CONTROL MEASURES: In June-July spray undersides of leaves with soft soap (10 lb. to 40 gal. water). Resin-soda spray is effective control (resin 10 lb., commercial caustic soda 3 lb., fish oil $1\frac{1}{2}$ lb., water 40 gal.). Do not spray at other periods of year during very hot weather. In spring and early summer, D.D.T. (0.1%) can be used, or derris (1 lb., soft soap $1\frac{1}{2}$ lb., water 40 gal.) applied. Fumigation with low dosages hydrocyanic acid gas for a short period can be used in spring and early summer. This stupefies bugs and causes them to fall to ground. Collect and destroy.

Brown or Olive Scale (*Saissetia oleae*)

Injures trees, chiefly citrus, by sucking sap. Damage also caused by copious growths of sooty moulds on honeydew excretions of scales. Brown olive scale is larger than red scale. Oval in shape, with raised H marking on back. Colour from light to very dark brown.

CONTROL MEASURES: Once scale has been killed by spraying, sooty moulds will disappear. Spray citrus in mid-December with white oil (1 in 40). When ants are numerous on infested trees, hatching of young scales has occurred. Spray figs with white oil emulsion (1 in 40) when young scales observed, and use miscible red oil (1 in 25) for peaches, quinces and apricots during late dormant period.

Brown Vegetable Weevil (*Listroderes costirostris*)

Grubs (yellowish green and up to $\frac{1}{2}$ in. long) attack carrots, parsnips, beetroot, lettuce, tomatoes, potatoes, and other vegetables.

CONTROL MEASURES: Spray with lead arsenate (1 lb. in 25 gal. water) or dust with lead arsenate 1 part, lime 4 parts. Bait used for cutworms is effective.

Cabbage White Butterfly (*Pieris rapae*)

Grubs attack cabbages, cauliflowers, Brussels sprouts, kohlrabi, swedes, turnips and horse radishes. Also attack flowering crucifers (stocks) and cruciferous weeds. Caterpillars are long (up to $1\frac{1}{2}$ in.), velvety green, with faint yellow stripes down back and along each side. Feed first on undersides of leaves and then eat holes through and may only leave veins.

CONTROL MEASURES: As soon as butterflies are seen, dust with 50% lead arsenate dust or D.D.T. vegetable dust. Or spray with 4 oz. lead arsenate paste (or 2 oz. lead arsenate powder) in 4 gal. water. Treat every 10 to 14 days.

Cabbage Looper (*Autographa brassicae*)

Larva of a night-flying moth. Green with white stripes down each side. About 1 in. long. Moves by "looping."

CONTROL MEASURES: Same as for cabbage white butterfly.

Cabbage Moth or Riddler Grub (*Plutella maculipennis*)

Destructive green caterpillar ($\frac{1}{2}$ in. long) eats holes in leaves of cabbages, cauliflowers, broccoli, kale, radishes and turnips.

CONTROL MEASURES: Same as for cabbage white butterfly.

Canary Fly

(See Leaf-hopper)

Cherry Borer (*Maroga unipunctata*)

Grub of moth destroys apricot, cherry, peach, pear and plum trees by boring into branches. Dust (like fine sawdust) is left outside hole.

CONTROL MEASURES: Insert pliable wire in hole and twist to kill grub. Or inject a few drops of kerosene into hole to cause caterpillar to emerge. Plug tunnels afterwards with grafting wax or putty.

INSECT PESTS

Cherry Green Beetle (*Diphucephala colaspoides*)

Attacks leaves of cherry, peach, plum and apple trees, roses and garden plants. Large swarms will strip trees very quickly.

CONTROL MEASURES: If no fruit on tree, spray with arsenate of lead when beetle appears. When fruit is ripening, spray with hellebore powder (1 oz. in 2 gal. warm water). Use when fresh; deteriorates with age and exposure.

Codling Moth (*Cydia pomonella*)

Attacks all pome fruits (apples, pears, quinces) and occasionally stone fruits and walnuts. Eggs laid at calyx of young fruit and on leaves. Grubs hatch in 8 or 9 days and eat into core. Then they eat tunnel to outside (leaving mass of excrement behind). They lower themselves to ground and begin life-cycle again. Several broods in each season.

CONTROL MEASURES: Three types of control — orchard hygiene, bandaging, and spraying. Sprays are effective at only two stages of life-cycle. A white oil ovidice is used against the eggs, and arsenate of lead is used to provide a constant cover on the fruit to poison the young grubs as they try to enter the fruit. Destroy fallen infested fruit. Lead arsenate (2 oz. powder to 4 gal. water) is sprayed first after petals fall and before calyx cup closes, and at intervals of 21-30 days until within three weeks of gathering fruit. White oil will give good results after first lead arsenate spray. In bandaging, thick bagging (or chemically-prepared bandage) is placed around tree to trap cocoons. Examine bandages and destroy larvae at least every 10 days.

Crusader or Holy Cross Bug (*Mietis profana*)

Pest of citrus trees and ornamental shrubs. Also attacks beans and tomatoes. About 1 in. long and dark brown or greyish-brown. Has diagonal cross on back.

CONTROL MEASURES: Hand-picking is best method. Benzol emulsion, nicotine extracts or pine spray may be used.

Cutworms

Larvae of night-flying moths. Soft-bodied and cylindrical. Colour varies from green

to slaty-grey or black. Feed at night; hide in soil in daytime. Up to 1½ in. long. Eat through young plant stems, cutting them off at ground level. Climb older plants and destroy foliage.

CONTROL MEASURES: Lead arsenate spray is helpful. Effective poison bait is: Bran 30 lb., Paris green 8 oz., molasses 4 lb., water as needed. Spread mash along rows of infested plants or broadcast through crop. (Bait is poisonous to humans and to stock.)

Dicky Rice Weevil

CONTROL MEASURES: Attacks citrus trees. Band tree trunk with sticky tree-banding material. Apply bands before and not later than blossoming. Spray with lead arsenate (1 in 20) as soon as observed. In October use D.D.T. spray (0.1%). Apply when petals have fallen.

Elephant Beetle (*Orthorrhinus cylindrostris*)

Long snout of this large brownish weevil bores into trunks of orange and lemon trees, causing them to die.

CONTROL MEASURES: Paint trunks at end of September with copper sulphate 1½ lb., quicklime 1 lb., water 2 gal. (If hydrated lime is used, take 1½ lb.) Maintain trees in healthy condition and re-soil where main roots are exposed. The copper sulphate paint acts as deterrent to egg-laying beetles.

Frosted Scale

Attacks apricots. Spray in winter with miscible red oil (1 in 25). Pay special attention to undersides of young laterals.

Fruit Fly, Mediterranean (*Ceratitis capitata*)

Attacks peach, orange, banana, quince, apple, tomato, grape and other fruits. Female's ovipositor punctures fruit (in all stages from green to ripe) and eggs are laid within fruit. Creamy white, legless maggot (one-third of inch long) is destructive. Has hooklike jaws and burrows into fruit, which often decays.

CONTROL MEASURES: Pick up and destroy fallen and infested fruit. Apply foliage poison spray (2 oz. sodium fluosilicate or 2 oz. tartar emetic, 2½ lb. sugar, and 4 gal. water). Apply in patches at rate of 6 fl. oz. per tree, avoiding fruit. Begin

INSECT PESTS

spraying five weeks before ripening or harvesting of fruit. Spray every seven days. Continue spraying for four weeks after harvesting ends. Spray citrus from December onwards for main crop Valencia's. Spray in March to May for main crop navel's, grapefruit or mandarins. Intermediate second crop, six weeks before colouring.

For trapping fruit fly, effective bait is: Essence of vanilla, $\frac{1}{2}$ fl. oz., ammonia (household) $\frac{1}{2}$ fl. oz., water 26 fl. oz. One trap is needed to every eight trees at least, and is hung about 5 ft. from ground in sheltered position. Clean out traps and renew lures at least once a week.

Fruit Fly, Queensland (Chaetodacus Tryoni Froggatt)

Life history of Queensland fruit fly is practically identical to that of Mediterranean species. Similar control measures.

Fuller's Rose Weevil

CONTROL MEASURES: When first weevils appear, spray with D.D.T. (0.05%). Cryolite ($1\frac{1}{2}$ lb. to 50 gal. water) may be used. If not included with routine oil spray, white oil ($\frac{1}{2}$ gal. to 100 gal.) should be included as spreader. Cryolite must not be used with Bordeaux mixture. Banding may be applied (see Dicky Rice Weevil).

Green Vegetable Bug (Nezara viridula)

Attacks most vegetables (especially tomatoes and beans). Sucking of sap causes tomato fruits to become discoloured and mottled. Adult bug is shield-shaped ($\frac{5}{8}$ in. long) and greenish.

CONTROL MEASURES: Young bugs may be dusted with pyrethrum powder (freshly mixed with equal quantity of $2\frac{1}{2}\%$ nicotine dust). Handpicking of bugs and eggs useful.

Harlequin Fruit Bug, or Soldier Bug (Dindymus versicolor)

Sucks juice from fruits, causing them to spot. Very destructive to garden plants (especially dahlias and tomatoes). Large, brightly-coloured insect (yellow, red and brown on top and green underneath). Adults winter under tree bark or in dry litter.

CONTROL MEASURES: Spray with nicotine solutions, benzole emulsion, white

oil. Dust with nicotine (not tobacco) dust. Do not allow litter to provide breeding places.

Leaf-hopper, Canary Fly, Jassid (Typhlocyba froggatti)

Green to brown insects, smaller than Rutherglen Bug. Hop quickly when they fly from leaves. Feed on apple tree, causing leaves to curl and yellow and fall prematurely. Fruit also spotted with brown specks of excrement (difficult to remove except by washing). Pest sometimes occurs on pear, plum and cherry trees. One brown species transmits big bud virus disease of tomatoes.

CONTROL MEASURES: Use calyx and first cover spray of D.D.T. (0.1%). Combine nicotine sulphate spray (40%) 1 pint, plus 3 lb. hard soap to 75 gal. water. Do not use soap when spray combined with arsenate of lead or lime-sulphur. Pay particular attention to undersides of leaves.

Longicorn Borers

Trees showing gumming are frequently infested during late summer.

CONTROL MEASURES: Keep citrus trees in good health. In skeletonising or pruning take precautions to prevent die-back. Skeletonised trees should be sprayed as soon as possible with lime-sulphur (3 in 40). When shoots begin to develop, Bordeaux mixture spray is normally applied. Paint pruning stubs with bitumen paint.

Lucerne Flea (Smynturus viridis)

Small green insect which hops when disturbed. Attacks tender young growth of most vegetables. Feeds on leaves and may completely skeletonise them.

CONTROL MEASURES: Lime-sulphur (1 in 50) with calcium caseinate spreader is effective. Apply two to three weeks after first autumn rains. Nicotine sulphate spray (1 to 800) or nicotine dusts may be used. Keep down weeds, specially Cape dandelion, as these form breeding places.

Pear and Cherry Slug (Caliroa limacina)

Destructive larva of a saw-fly. Becomes slug-like by hiding its true outline with dark brown glossy slime. Feeds on upper

INSECT PESTS

side of leaf-tissue of pears, peaches, quinces, plums, cherries, hawthorns. Attacks trees mainly in late spring when foliage is young.

CONTROL MEASURES: When slugs first appear, spray with D.D.T. (0.1%). Do not spray fruit within three weeks of picking. When fruit is very small, or after harvesting, use lead arsenate powder (1 lb. to 80 gal. water).

Pink Wax Scale

(See White Wax Scale)

Potato Moth (*Phthorimoea operculella*)

Grubs tunnel into leaves and stems, and finally pupate in dirt-covered cocoon on ground. Some generations lay their eggs in tubers.

CONTROL MEASURES: Deeply hill up potato plants to prevent moths reaching them to lay their eggs. At digging time do not expose potatoes to moths during late afternoon or overnight. Do not pile infested haulms over potatoes, as grubs leave them and burrow into tubers. Fumigate infested tubers in storage with carbon bisulphide. If tomatoes are attacked, use arsenical dusts from seed bed stage onward for later plantings. Dust every 10 to 14 days.

Purple Scale

(See Red Scale)

Red Mite, the Clover or Bryobia Mite (*Bryobia practiosa*)

Sucks juice from wide range of plants and trees, including most deciduous fruit trees, clovers, vegetables, garden flowers, and grasses. Young mites are red, becoming brownish when fully grown. This species is larger than insect commonly called Red Spider. Eggs are red, globular, and are often found on young fruit spurs and garden foliage. Attacks on leaf cells cause bleaching. Severe attacks seriously weaken tree. Hot, dry conditions favour mites.

CONTROL MEASURES: During dormant period, if infestation of over-wintering eggs is heavy, spray with miscible red oil (1 in 20). During spring and summer, if required, use wettable sulphur (5 lb. to 100 gal. water), plus lime-sulphur (1 in 100). Other sprays are: Colloidal sulphur (2½ lb. to 100 gal. water) and H.E.T.P.

(½ pint to 100 gal. water). Winter strength lime-sulphur sprays are not recommended because of early blossoming of almonds before eggs begin to hatch. H.E.T.P. spray must be used with neutral spreader or wetter. Not compatible with Bordeaux, lime-sulphur, white oil or calcium caseinate.

Red Scale (*Aonidiella aurantii*)

Most injurious pest of citrus trees. Sucks sap and weakens trees, causing death of shoots or branches. Infested fruit must be brushed or washed before sale. Small reddish-brown insect secretes cottony threads which form wax covering. Male insects are fully developed with wings at about eight weeks and leave their scales to fertilise females. Each female produces about 150 crawlers.

CONTROL MEASURES: In January-April or July-August, fumigate citrus trees with hydrocyanic acid gas. Do not fumigate when trees are out of condition, or during same season after application of Bordeaux mixture, or injury may result. But Bordeaux mixture can safely be used after fumigation. In mid-December to March, spray with white oil (1 in 40). Two sprayings may be needed (mid-December and mid-February) if infestation is bad. Too much oil may lead to reduced blossoming next season.

Red-legged Earth Mite (*Halotydeus destructor*)

Attacks practically all annuals. Has shiny black body and bright red legs. Attacks most severe on young seedlings. Affected leaves have bleached appearance.

CONTROL MEASURES: Keep ground clean, for weeds generally harbour mites. Dust soil surface with 15% carbolic powder 1 lb., with 4 lb. slaked lime or superphosphate. Use nicotine (as for aphids) or derris powder 1 lb., nicotine dust 8 lb. Suitable sprays are: (1) White oil emulsion 6 fl. oz., nicotine sulphate 1½ fl. oz., water 5 gal. (2) Disinfectant phenyle 1 part, water 80 parts. (3) Kerosene emulsion 1:8.

Red Spider (*Tetranychus telarius*)

Sucks sap from a wide range of host plants (including peas and beans), causing leaves to turn yellow and die. Adult (dull yellow to brick red) is just visible to naked eye. Therefore, difficult for amateur to de-

INSECT PESTS

fect pest until plant has been damaged. Look on under-surface of leaves for round, microscopic, transparent eggs. Pest multiplies rapidly, producing fine webbing on under-surface.

CONTROL MEASURES: Spray with lime-sulphur ($\frac{1}{2}$ pint in 4 gal. water) or red oil, 1:20, when buds begin to swell. If insects present on leaves in summer, spray with white oil or nicotine solutions. Spray must reach underside of leaves. Dust in summer and early autumn with equal parts of finely-powdered sulphur and lime.

Root Borer (*Leptops squalidus*)

Grub attacks apples, pears and vines by tunnelling along roots. The beetle eats the leaves. Beetle climbs tree, fastens leaves together with sticky substance, then lays eggs. Young grubs drop to ground and feed on roots.

CONTROL MEASURES: Place a 3½ in. zinc band (or sticky banding material) round tree trunk, 18 in. from ground. Watch for beetles on leaves and destroy them. Keep orchard clean in spring. Band trees before early spring, when beetles climb trunk. Collect and destroy beetles at regular intervals and renew bands when needed. Use D.D.T. spray (0.1%) when beetles first appear, and repeat at intervals of two weeks. Also spray ground and litter beneath tree. Do not spray blossoms. Handpick beetles whenever seen.

Rust or Silver Mite

CONTROL MEASURES: Damage to citrus fruit begins when it is only $\frac{1}{2}$ in. to 1 in. in diameter. Begin control at this stage (early in December). Use lime-sulphur (1 in 40). Lime-sulphur cannot be used after Bordeaux mixture in the same season, otherwise injury may result. In mid-December and mid-February spray with white oil (1 in 40).

Rutherglen Bug; or Fly (*Nysius vinitor*)

Small brown fly-like, sap-sucking insect (one-sixth of inch long). Has silvery-grey wings. Lays eggs on grass and weeds. Long pointed beak sucks sap from wide variety of fruits (including tomatoes) and from soft green tops of vegetables (especially potatoes) and flowers. Attacks cause plants to shrivel. Peaches, cherries and apricots may be ruined. Active in mid-summer. Numerous broods in a season.

CONTROL MEASURES: As adult insects hibernate in grass and weeds in winter, avoid having dead vegetation and other litter lying about. Use smudge fires in orchards. Spray with benzole emulsion, or with mixture of benzole emulsion and nicotine sulphate. Dust or spray with derris dust. If in plague numbers use 0.1% D.D.T. emulsion or 2% D.D.T. dust.

San Jose Scale (*Aspidiotus perniciosus*)

Small light orange insect. Attacks trunk, limbs, foliage and fruit of apple, pear, cherry, plum, apricot trees. Also infests roses, shrubs and hedge plants. Light red rings appear around scales when apples and pears are attacked. Adult female scale is circular, slightly convex, and about size of pin's head. Male scale is smaller and more elongated. In spring males emerge from scale and mate with females. Females produce living young (sometimes several hundred). Young leave mother scale and begin sucking plant sap. Gradually they become covered with waxy threads, and protective scale is formed. They moult in two weeks and lose legs. Males have two more moults and then become two-winged insects. Females remain wingless, legless insects.

CONTROL MEASURES: Spray with miscible red oil (1 in 25) in dormant period. At bud-swell stage spray with lime-sulphur (1 in 30), plus semi-dormant oil (1 in 100). D.N.C. oil (1 in 40) can also be used during dormant period. On pome fruits, oil sprays are preferable. They loosen bark which tends to become harsh after lead arsenate sprays. On stone fruits use miscible red oil (1 in 25) in winter after pruning.

Snails

CONTROL MEASURES: Apply poison baits late in afternoon or at night. Use calcium arsenate 1 lb., bran 16 lb., water 2 gal.; or metaldehyde 1 oz., bran 3 lb., water 3 pints. Calcium arsenate baits must not be spread over citrus trees, or fruit and leaves may fall. From March to May or in early spring, Bordeaux mixture 2:2:80, plus white oil (1 in 80) may be used. Addition of $\frac{1}{2}$ pint nicotine sulphate is advisable when snails are on trees. Ducks (2 per acre) may be used in late summer.

Soft Brown Scale

(See Red Scale)

INSECT PESTS

Spiny Lemon Bug

Attacks all citrus varieties, but favours lemons and mandarins.

CONTROL MEASURES: D.D.T. spray (0.1%) in February-March may be combined with white oil and Bordeaux mixture. Bugs and egg masses should be destroyed when lemons are being picked.

Thrips, Common or Plague (Thrips imaginis)

One of worst insect pests. Attacks all kinds of fruits, flowers and vegetables (especially onions). Serious damage done to apples, pears, peaches and plums by thrips feeding in large numbers on blossoms. These wither and fall prematurely, preventing setting of fruit. Citrus and grape blossoms may also be attacked.

CONTROL MEASURES: Control very difficult because of large number and variety of host plants. Another important factor is that eggs are inserted just below skin in all parts of blossoms and adjacent leaves. Spray apples with D.D.T. (0.1%) at pinking, or later as needed. Population of 20 or more per blossom is regarded as plague infestation. Spray bananas from early October onwards. D.D.T. dust (2%) can be applied four times at intervals of two weeks from time bunch is thrown. Spray citrus with D.D.T. (0.1%) in December, January and February. Main crop Valencias are most liable to injury. D.D.T. or nicotine sulphate $\frac{1}{2}$ pint, white oil 1 gal., water to make 40 gal., may be included with routine white oil sprays for control of red scale.

Tomato Grub (Heliothus obsoleta)

Larva of light greyish-brown moth. Attacks tomatoes, peas, beans and maize.

CONTROL MEASURES: Spray with lead arsenate powder (2 lb. to 40 gal. water) or dust with lead arsenate dust.

INSECTS THAT ATTACK FLOWERING PLANTS

ASTER: Green fly.

BEGONIA: Thrips, mites.

CARNATION: Wireworms, eelworms.

CHRYSANTHEMUM: Leaf-mining fly, green and black fly, aphids.

CRATAEGUS: Pear slug.

DAHLIA: Ear wigs.

DELPHINIUM: Slugs and snails.

GLADIOLUS: Caterpillars, slugs, wireworms, thrips.

White Louse Scale (Chionaspis citri)

Infests trunk and main limbs of citrus trees. Can build up rapidly and spread to twigs, leaves and even fruit. Females are elongate and oval and dull brown to almost black. Difficult to detect. Males are white, and tree looks whitewashed when heavily infested.

CONTROL MEASURES: Difficult to control with scalecides. Fumigation can be done in May-August. Spray in June-July with lime-sulphur (1 in 40), plus lime casein spreader ($\frac{1}{2}$ lb. to 40 gal.). See warning under Rust Mite. On Navel oranges, complete spraying of trees may be needed if Bud Mite also present.

White Wax Scale (Ceroplastes destructor)

Feeds on citrus trees. Usually in huge numbers on twigs, which may be killed. Damage to tree may lead to reduced size of fruit. Sooty moulds thrive on secretions of white wax scale. This leads to photosynthesis and affects appearance and value of fruit. Pink wax scale causes almost identical type of injury. Small reddish eggs are laid beneath wax covering. Reddish crawlers hatch in early summer and settle along midribs and veins of foliage. Secrete waxy covering. At this stage (when about pinhead size) they are most vulnerable to attack. Only one generation a year.

CONTROL MEASURES: In mid-December, when larvae are on leaves (and before wax production on stems begins) spray with white oil (1 in 40). Thorough spraying over leaf surface essential. Lime-sulphur spray (1 in 40, plus lime casein spreader $\frac{1}{2}$ lb. to 40 gal.) can be used in December. At "peak" stage (about mid-February) use washing soda spray (10 lb. or $3\frac{1}{2}$ lb. soda ash to 40 gal. water). For later stages use washing soda (15 lb., or soda ash $5\frac{1}{2}$ lb. to 40 gal. water). Similar control for pink wax scale.

INSECT PESTS

INSECTS THAT DAMAGE YOUR LAWN

Curl Grub (Aphodius Howitti)

Prevalent where clover dominant in lawn. Body ($\frac{3}{4}$ in. long, fully developed) blue-grey to lemon yellow (according to age). Lives in vertical burrows. Denudes vegetation.

CONTROL MEASURES: Apply lead arsenate (2 lb. per 1000 sq. ft.). Use damp sieved loam or sand as spreader. To prevent re-infestation, apply D.D.T. (1 lb. or 2% dust per 300 sq. ft.). Apply January, February.

Curl Grub (Sericesthis pruinosa)

Grub moves horizontally, just below lawn surface. Body cream, head yellow. Up to 1 in. long. Kills grass. Activity of insectivorous birds may be first sign of infestation.

CONTROL MEASURES: In September-October apply 10% D.D.T. dust (1 lb.

per 200 sq. ft.). Will have little effect on current infestation, but will prevent re-infestation.

Curl Grub (Adoryphorus couloni)

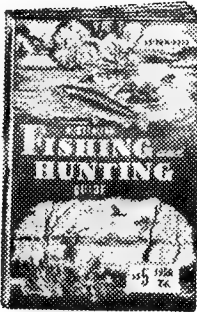
Very sluggish grub (1 in. long). Body blue-grey to cream, head reddish-brown.

CONTROL MEASURES: No reliable control. Best plan is to remove dead grass, collect all grubs (and associated adults—hard black beetles) and work in 10% D.D.T. Resow infested area.

Oncopera Caterpillar

Up to $2\frac{1}{2}$ in. long. Body green-grey to cream, head dark. Forages from vertical burrows. Kills grass.

CONTROL MEASURES: Do not allow grass to become rank in spring. When caterpillars first noticed, apply 2% D.D.T. dust (1 lb. per 250 sq. ft.).



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INSECTICIDES, FUNGICIDES, SEED DISINFECTANTS, WEEDICIDES, Etc.

Insecticides, weedicides, seed and soil disinfectants are each of similar composition, but are marketed by different firms under their own trade names. The following is a complete list for Victoria, but many are sold under the same name throughout Australia. Some are marketed under different names in different States. In each case adequate instructions for use are usually provided with the container or in leaflets. Your State Department of Agriculture will assist in giving you latest information on pests and diseases.

INSECTICIDES

Arsenate of Lead (Paste)

Hortico
Berger's Mercury
Blue Bell
Elephant
Lion
Ramtre
Vallo
Tip Top
Pannifex
Lane's

Arsenate of Lead (Powder)

Blue Bell
Arsinette
Elephant
Lion
Ramtre
Plane
Vallo
Berger's Mercury
Pannifex
Lane's
Tip Top
Hortico
Sigma
Unity

Arsenate of Lead with D.D.T. and Arsenic

Blue Bell D.D.T.—Lead
Elephant D.D.T.—Lead
Unity Mercurated Lead
Arsenate Powder

Calcium Arsenate

Lion
Vallo

Paris Green

Felton, Grimwade and
Duerdin's
Nosco

Tartar Emetic

Lane's Tartar Emetic

Nicotine Sulphate

Hortico
Blue Bell

Elephant
Plane
Vallo
Black Leaf 40 (Neptune)
Neptune
Hart's
Elliott's
Taubman's
Kix
Grazcos
Wilmo
Sigma
Tip Top
Nico Spray 40

Nicotine Dusting Powders

Plane Nicodust No. 2
Plane Nicodust No. 3
Ramtre No. 5
Vallo N.40
Pestend Tobacco Dust
Rudust No. 16
Nico-3-Dust
Nico-5-Dust
David Gray's Tobacco Dust

Tar Distillate

Ovicide
Vallo Ovicidal Wash
Blue Bell
Elephant
Hortico Winterwash
Winterwash A
Wintrol (Tar-Oil)
Lion

Rotenone Dusting Powders

Pulvex (Cooper's)
Katakilla
Nosco Derris Dust
Derridust
Hortico Derris Dust

D.D.T. Dusting Powders

Plane Noxide No. 100
Plane Noxide No. 200
Plane Noxide No. 500
Hortico
Pespruf No. 2

Deedust
No-Verm Dust
Taubman's Rudust No. 5
Taubman's 15 per cent.
Taubman's Rudust No. 4
Neptune Float-on No. 2
Neptune Float-on No. 1
Pespruf No. 7
Caulicab

D.D.T. Sprays

Pespruf 20 Emulsion
Pespruf No. 50 Dispersible
Powder
Vermpruf 1A
Vermpruf 3C
Rucide
Taubman's Rulene
Taubman's Rutox
Wellspray Emulsion
Emulsane 25
Neptune Emulsion
Boxox
Kix
Agro-Kix No. 20
Wellspray 50 Dispersible
Powder
Blue Bell Non-Oil Emulsion
Elephant Non-Oil Emulsion
Guesarol G.H. 40 Suspensible
Powder
Guesarol F.S. 40 Suspensible
Powder
Guesarol B.W. 40 Suspensible
Powder
Emulsane 50 Paste
Shell 25 per cent. Emulsion
Neptune Emulsion 25
Taylor's No. 13 Emulsion
Blue Bell Diaphid
Elephant Diaphid
Destructol Powder
Aphietox
Neptune Aphidol
Shell Aphis Spray
Aphex D.D.T. Dormant
Spraying Oil

Benzene Hexachloride Dusting Powders

Gammexane No. 4
Gammexane No. 10
Gammexane No. 20
Gammexane Smoke Genera-
tor (Nos. 2 & 12)

INSECTICIDES

Gammexane Smoke Generator (No. 22)
 Plane Gammacide No. 2
 Plane Gammacide No. 3
 Plane Gammacide No. 5
 B.H.C. 4
 B.H.C. 10
 B.H.C. 20
 Cooper's Louse Powder
 Lorexane

Benzene Hexachloride Sprays

Gammexene No. 7 Miscible Oil
 Gammexene Liquid L.G. 140
 Gammexene No. 50 Dispersible Powder
 Gamaturf
 Nik-kof
 Grazcos Gammexane Dispersible Powder
 Gamaphex
 Lane's B.H.C. 50 Dispersible Powder

Organic Phosphates

Hexone
 Vallo H.E.T.P.
 Blue Bell Demite
 Elephant Demite
 Hetraphos
 Tephos
 E 605 Folidol
 Folidust E 605m
 Paraphos 40
 Phosphone 20
 Phosphone 15 Dispersible Powder
 Parathion 25 per cent.
 Unity Parathion

Mixed Dusting Powders

Plane A.P. No. 50N
 Vallo N.3 A.L.30
 Plane Aphidust No. 2
 Plane Peamite No. 2
 Neptune Float-On No. 7
 Plane Tomato No. 50
 Plane Azurine No. 20
 Vallo Tomato and Vegetable No. 1
 Vallo Tomato and Vegetable No. 2
 Tomato No. 2

Plane Azurine No. 2
 Plane Azurine No. 4
 Neptune Float-On No. 6
 Tomato 50
 Azurine
 Plane Noxide No. 100N
 Plane Noxide No. 100N2
 Plane Noxide No. 200N
 Plane Noxide No. 200N2
 Plane Azurine No. 100
 Plane Azurine No. 200
 Plane Azurine No. 400
 Tomato No. 1
 Pespruf No. 5
 Plane Tomato No. 200
 Neptune Float-On No. 5
 Neptune Float-On No. 3
 Rudust No. 1 (Tomato)
 Rudust No. 2 (Tomato)
 Kix Tomato Dust
 M.I.A. Tomato Dust No. 1
 M.I.A. Tomato Dust No. 2
 Pespruf No. 2G
 Pespruf No. 4G
 Plane Noxide No. 100G1
 Plane Noxide No. 100G2
 Plane Noxide No. 200G2
 Plane Vegedust
 Neptune Float-On No. 8
 Cabbage No. 2
 Rudust No. 8 Duplex
 Kix Garden
 Rudust No. 15
 Lane's All Purpose
 Plane G.P.
 Plane Tomato No. 157
 Plane Potato
 Plane Azurine No. 3G2
 Plane Lettuce
 Composite
 Neptune Float-On No. 4
 All in One
 Mortein Garden

White Spraying Oil

Hortico
 Blue Bell
 Alboleum
 Elephant
 Gargoyle
 Kleenup
 Lion
 Neptune
 Neptune Clarifol
 Vallo
 Voick
 Shell Whitespray
 X.L.

Atlantic Emulsified
 Albarol
 Tip Top
 Wilmo

Pale Spraying Oil

Gargoyle
 Neptune Palsol
 Shell Palespray
 Shellicide D
 Nosco
 Blue Bell
 Elephant

Red Spraying Oil

Hortico
 Blue Bell
 Elephant
 Gargoyle
 Gargoyle M.
 Lion
 Neptune "A"
 Neptune "C"
 Shell Redspray
 Vallo
 X.L. (Emulsion)
 Atlantic
 Harbas
 Tip Top
 Wilmo
 Scalex

Winter Spraying Oil

Shell Universal Winter Spray
 Winsol
 Vallo D.N.C.
 Capsine D.N.O.C. Dormant
 Ovicidal Spray
 D.N.C.

Snail and Slug Killers

Bug-Geta
 Sure Death
 Defender
 Slugtox
 Brown Magic
 Instant 265
 K.O.4
 Metaslug
 Killsem
 Taylor's No. 13
 Kix Snail Death
 Dinki-di Snaildeath
 Plane Snail-death
 David Gray's Snail Killer
 Eat-N-Die

WEED DESTROYERS

(Chlorates)

Atlacide C.A. Solution
 Atlacide C.A. Powder
 Ramtre
 Vertan
 Nosco Sodium Chlorate

(Arsenical)

Kix
 Weed-Nox
 Bell's Dandy Blue

Cooper's Weedicide
 Globe
 Globe Weed and Scrub
 Vallo Weed, Scrub and Tree
 Vallo Arzeen
 Vallo Liquid Arzeen
 Vallo Liquid Pentoxide
 Hart's Soluble Arsenic Liquid
 Hart's Killaweed
 Vetamac No. 1
 Nosco Powder
 Nosco Liquid
 Elliotts Voskin
 Elliotts Gortex

(Hormone Type)

Methoxone
 Shell Weed Killer "M"
 Tuloxone
 Tuloxone Concentrate 30
 Phenoxone
 Chloroxone
 Vetamac S.2,4,D
 Weedone Lawn Weed Killer
 Weedone Concentrate 57
 Weedar 77
 Fixweed (2,4-D) Liquid
 Fixweed Powder

WEED DESTROYERS

Fixweed Concentrate 50%
 Fixweed Ester
 Hormex 5X
 Vallo 2,4-D
 Kix
 Wilmax
 Di-Weed 50 Liquid
 2,4 Di-Weed
 "D" Death Weedkiller
 Taubman's No. 6
 Taubman's No. 7
 Taubman's No. 8
 Blue Bell Weed-a-Salt
 Elephant Weed-a-Salt
 2,4-D Selective Weed Killer
 2,4-D Ester Weed Killer
 Estex 40
 Elliott's 2,4-Ditox
 Elliott's 2,4-D-Estox
 2,4-D Amine Salts
 Shell Weedkiller "D"

Vallo Amine Liquid Weed-
 killer
 Nocweed "A"
 Nocweed "E"
 Nocweed 2,4-D Sodium Salt
 Estoxone
 Amine D-Death
 Nocweed, 2,4,5-T
 Killaberry 1600
 Weedone Special 2,4,5-T
 Weedone Blackberry Killer
 Killaberry 800
 Hortico Blackberry Killer
 (concentrate)
 2,4,5-T Plus
 Blue Bell Di-Scrub
 Trimex
 Di-Weed 5-T Concentrate
 Finis Black
 "D" Death Blackberry Killer
 Trioxome

Taubman's No. 11 Weed-
 killer
 Weedone Brush Killer 32
 Vetamac Blackberry Killer
 Elephant Di-Scrub
 Nocweed Brushkiller
 Weedone Di Ester
 Weedone Hi Ester

(Miscellaneous)

A.D.S. Grasskiller
 Hortico T.C.A.
 Weedone T.C.A.
 Nettlefold's T.C.A. . .
 Keogh's T.C.A. Grass and
 Weed Killer
 Nocweed T.C.A.
 Nocweed P.C.P.
 Pamex Weed Killer

FUNGICIDES AND SEED DISINFECTANTS

Some of these preparations are used for spraying or dusting on to trees and vegetables; some are used for "pickling" stored or sown seed; some serve both purposes. Usually adequate instructions are supplied with the product in leaflets or on the container.

Sulphate of Copper (Bluestone)

Blyth's
 Jaques'
 Macclesfield
 Neptune
 Neptune Snow
 Hart's Sugar Bluestone
 Hortico
 Mellor's
 Lane's

Basic Copper Salts

I.C.I.A.N.Z. (Carbonate)
 Smutol (Oxychloride)
 Vallo Anti-Bunt (Oxy-
 chloride)
 Cuprox (Oxychloride)
 Elliott's Bunticide
 Vallo Copper Spray (Oxy-
 chloride)
 Copper-50-Spray (Oxy-
 chloride)
 Kopi (Oxychloride)
 Cuprolane
 Soltosan (Oxychloride)
 Elephant Coppo
 Blue Bell Coppo
 Kilspor (Carbonate)

Bordeaux Mixture

Hortico (powder)
 Lion (powder)
 Vallo (powder)
 Bord-O-Kwik (paste)

Burgundy or Copper- Soda

Neptune Copper Spray
 Blue Bell
 Elephant

Lime-Sulphur (Solution)

Hortico
 Blue Bell
 Elephant
 Lion
 Neptune
 Vallo
 X.L.
 Harola
 Tip Top
 Wilmo

Lime-Sulphur (Dry Mix)

Pannifex
 Vallo

Sulphur

Commonwealth (Dusting)
 Commonwealth (Powdered)
 Commonwealth (Atomic
 Dusting)
 Commonwealth (Atomic)
 Commonwealth (Wetomic)
 Flotox
 Neptune (Powdered)

Vallo (Powdered)
 Vallo (Dusting)
 Vallo (Wettable)
 Wetsul
 Plane (Dusting)
 Blue Bell (Colloidal)
 Elephant (Colloidal)
 Hortico (Dusting)
 Spregan (Colloidal)
 Cosan (Colloidal)
 Nosco (Dust)

Formalin

Sickle or I.C.I.

Mercury Compounds

Ceresan
 Germisan
 Lunasan
 Agrosan
 Aretan
 Baytan
 Drisan
 Unity Venturicide
 Elliott's Puraseed
 Calo-Chlor
 Keotized Mercury E.

Thiotox

Elephant Di-Rot
 Blue Bell Di-Rot
 Elephant Ziram 80
 Blue Bell Ziram 80

SOIL DISINFECTANTS

Shell D-D Soil Fumigant

Wilto Soil Treatment

Botanical Classification . . .

Botanical names are in a binomial system — each plant has a name consisting of two words. The first word is the generic name (or name of the genus); the second name is the specific name (or name of the species). For example, *Rosa canina*—the Dog Rose. *Rosa* is the name of the genus to which this plant belongs, while *canina* is the species name. Thus *Rosa canina* always identifies the Dog Rose, and no other.

The following shows the generic and the common names of a number of trees:—

Quercus—oak.
Ulmus—elm.
Salix—willow.
Populus—poplar.
Betula—birch.
Platanus—plane.
Pinus—pine.
Cupressus—cypress.
Cedrus—cedar.

Ficus—fig.
Malus—apple.
Pyrus—pear.
Cydonia—quince.
Eucalyptus—gum tree, etc.
Acacia—wattle.
Fraxinus—ash.
Acer—maple.

The specific names may refer to place of origin, habit of plant, colour, or may be named after someone, and so on, as the following examples show:—

Rosea—rose red or pink.
Coccinea—red.
Sanguinea—blood red.
Virens—green.
Niger—black.
Alba—white.
Stricta—upright.
Pendula—hanging.
Africana—from Africa.

Americana—from America.
Chinensis—from China.
Europaea—from Europe.
Borealis—northern.
Australis—southern.
Smithii—named by Mr. Smith.
Smithiana—named in honour of Mr. Smith.

Prunus is a genus which contains various well-known trees and shrubs, identified as under:—

Prunus armeniaca—Apricot.
Prunus mume—Apricot (Japanese or flowering).
Prunus domestica—Plum (European).
Prunus salicina—Plum (Japanese).
Prunus amygdalus—Almond.
Prunus persica—Peach.
Prunus persica var. *Nectarina*—Nectarine.
Prunus laurocerasus—Cherry Laurel.

Prunus cerasus—Sour Cherry.
Prunus avium—Sweet Cherry.
Prunus serrulata—Flowering or Japanese Cherry.
Prunus cerasifera—Cherry Plum.
Prunus cerasifera pissardii—Purple-leaved *Prunus*.
Prunus cerasifera moserii—Double pink *Prunus*.

Australian Garden Manual Guide to all Plants

ABBREVIATIONS: A.—Annual; D.—Deciduous; E.—Evergreen; H.—Hardy; P.—Perennial. Where an initial precedes a variety name, the initial refers to the genus or family. We cannot, in the space, list all varieties. Additional varieties are listed in the text. Our illustrations are by courtesy of Andersons.



I N D E X A



	Page
ABERIA (Kaffir Apple)	
A. caffra: E.; 20 ft.; thorny shrub and tree; useful hedges.	
ABIES	188
ABELIA	45, 89, 198, 206
Hardy shrub in all places; bright foliage; bell-shaped flowers in spring, summer, autumn.	
A. Schumannii (longituba): D.; rosy, lilac; 5 ft.	
A. rupestris (chinensis): Semi-D.; pink; 5 ft.	
A. uniflora: Difficult to propagate; 6 ft.	
ABUTILON (Chinese Lantern; Indian Mallow)	89, 203
Hardy; E.; rapid growers; thrive in all soils and situations; prune after flowering.	
A. Boule de Neige: 4 ft.; pure white.	
A. Eclipse: 8 ft.; orange, scarlet.	
A. Souvenir de Bonn: 6 ft.; orange.	
A. Sydney Belle: 6 ft.; yellow.	
A. megapotamicum variegatum: Creeping habit; for rock work, frangs.	
ACACIA (Wattle)	45, 186, 213
E. trees and shrubs; average life 15 years; prune after flowering; flowering winter to summer.	
A. Baileyana (Cootamundra): 20 ft.	
A. dealbata (Mimosa): 30 ft.	
A. Podalyriaefolia: 20 ft.	
A. pycnantha (Vic. Golden W.): 30 ft.	
A. elata (Cedar W.): Summer flowers; 30 ft.	
A. accola: Spring flowers; 20 ft.	
A. longifolia (Coast W.): 8 ft.	
A. prominens (Golden Rain W.): 12 ft.	
A. melanoxylon (Blackwood): 50 ft.	
ACALYPHA (Fijian Fire Plant)	
E.; rapid grower; colourful foliage; frost sensitive; prune early spring; north of Sydney.	
A. marginata: Leaves pink edged; 6 ft.	
A. Wilkesiana: Leaves richly coloured; 6 ft.	
ACANTHUS (A. mollis)	
P.; large glossy ornamental leaves, spreading; stems 3 ft. tall with flowers in spikes; cool, moist, shaded position, as under trees; propagate by root division.	
ACER (Maple)	45, 183, 202
D.; handsome hardy trees; beautiful autumn yellow-red foliage; cool and sheltered position.	
A. Negundo (Box Elder): Three-lobed green leaves; 40 ft.	
A. palmatum (Japanese M.): 6-20 ft.; green.	
A. compostre (English M.): 50 ft.	
A. Negundo aureum variegatum: Green and gold variegated leaves; ideal lawn; 15 ft.	
A. Pseudoplanatus (Sycamore): Handsome large foliage; 30 ft.; conspicuous long clusters of yellow flowers in spring.	
ACHILLEA (Yarrow, Milfoil, Sneezewort)	
P.; summer flowering; easily grown in ordinary soil; good drainage, full sun; propagation by division or seeds; cool climates.	
A. argenta: Yellow; rockeries.	
A. filipendulina: 2 ft.; yellow.	
A. Millefolium: 3 ft.; white flowers.	
ACMENA — See Eugenia	
ACONITE (Aconitum; Monkshood) . .	125
P.; tuberous-rooted, with tall spikes of violet delphinium-like flowers; shady position; poisonous.	
ACONITUM — See Aconite	
ACROLINIUM ROSEUM (Helipterum)	
P.; 12 in.; grown as A. Sow direct in autumn; sunny position; useful dry positions, borders, edges, bouquets, drying for winter decoration; daisy flowers 1 in. across in white, pink, salmon, crimson.	

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ARBUTUS UNEDO

ACTINOTUS (Flannel Flower; Australian Edelweiss)

P.; 2 ft.; attractive white-flowered bush with woolly leaves; prefer light soil; easily raised from seed in sandy soil; transplant to sunny or semi-shady position; prune after flowering.

ADENANDRA 198

ADENOPHORA (Gland Bellflower)

P.; hardy border plants, with fine blue flower spikes; sow seed in autumn or spring or divide the roots.

ADHATODA

A. vasica: E.; 8 ft.; rapid grower; dense foliage, white flowers.

AESCULUS

A. Hippocastanum (Horse Chestnut): D.; 80 ft.; cool climate; handsome foliage, spring flowers.

AFRICAN LILY 117

AFRICAN MARIGOLD (Tagetes erecta)

A.; 2-4 ft.; half hardy; sow spring, early summer; transplant to sunny position; best in medium rich soil only; good cut flower; tall and branching; many varieties; summer and autumn flowering; is a weed in Queensland.

Page

Cactus (Ball) Flowered: Large flowers, 3 in. across; lemon, orange (Lemon Queen, Orange King, orange).

Carnation Flowered (Guinea Gold): 2½ in. across; brilliant orange.

Gigantea (Sunset hybrids): Flowers up to 5 in. across; orange, yellow.

Yellow Supreme: Heavy scented; creamy yellow and lemon.

Chrysanthemum Flowered: Moonlight, soft primrose yellow flowers; 2½ in.; exquisite pompom head.

AGAPANTHUS 117

AGATHEA (Blue Marguerite)

A. coelestis: E. shrub; 2 ft.; hardy; produces flowers all year; useful low hedges; grows anywhere; prune after flowering.

AGATHIS 188

AGAVE 146

AGERATUM mexicanum (Floss Flower)

A.; h., 6 in. to 2 ft.; sow autumn, spring; transplant; shade, semi-shade; flowers blue and mauve, borne in large dense clusters, entirely covering bush; continues flowering if dead heads removed; frost tender; ideal borders, backgrounds.

Blue Cap: 6 in.; large rich blue flowers.

Swanley Blue: 6 in.; bright blue.

Tall Blue: 2 ft.; much branched.

AGONIS (W. Aust. Weeping Willow Myrtle)

A. flexuosa: E.; weeping habit; white flowers; resistant heat and wind; useful avenues; 30 ft.

AJUGA 151

AKEBIA 162

ALBERTA

A. magna: E.; attractive; 4-8 ft.; glossy foliage; scarlet tubular flowers.

ALEURITES

A. Fordi (Tung Oil Tree): E.; 20 ft.; moderate climate; decorative; nuts poisonous.

ALOE 147

ALYSSUM MARITIMA (Sweet Alice)

P. and A.; h., 4 in.; sow autumn, spring; sow direct or transplant; sun or shade; good for beds, borders, edges, hanging baskets, pots, window boxes, rockeries; quick growing; flowers most seasons; white; propagate by cutting or division.

A. m. procumbens: A.; spreading; rockeries.

Lilac Queen: Lavender.

Carpet of Snow: 4 in.; spreading; white flowers.

A. saxatile (Golden Tuft): P.; small yellow flowers; open position.

A. rostratum: P.; 2 ft.; hairy.

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ALONSOA (Mask Flower)		ANEMONE	117
P.; grown as A.; 18 in.; semi-trailing; can be grown in sheltered and warm position in rockeries, window boxes and edges.		P.; h., 12 in.; sow late summer, early autumn; best in rich soil; tuberous rooted; easily raised from seed; grown from seed they flower the first season and produce bulbs which can be transplanted next season; rub the seeds in sand to remove the coats before planting; brilliant blooms in early spring; valuable cut flowers, lasting well; many varieties; many colours.	
A. linearis: Scarlet.		A. St. Brigid, Blue Bonnet, and others.	
A. Warszewiczii: Rose-red and scarlet flowers.		A. Coronica (Poppy Anemone).	
ALOYSIA (Lemon Scented Verbena)—		A. japonica.	
See Lippia		A. japonica: Autumn flowering; underground stems; propagated by division; 2 ft. high; single and double flowers.	
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ALTHAEA — See Hollyhock		ANIGOZANTHUS (Kangaroo Paw)	
ALUM ROOT — See Heuchera		P. from West Aust.; curious tubular blooms on branching heads on hairy stems; warm and moist position; red and green; borders and rockeries.	
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AMARANTH (Amaranthus)		ANNUAL CHRYSANTHEMUM (Painted Daisy) (Chrysanthemum carinatum)	
A.; up to 3 ft.; sow direct in spring, summer; useful for hot and dry positions; plant after danger of frost; leaves and flowers are brightly coloured; useful for massed bedding.		A.; 3 ft.; sow autumn to late winter; spring and summer flowers; single daisy blooms 2 in. across solitary heads; the petals are banded in white and yellow; centres are dark. Several hybrid varieties, mostly good cut flowers, especially Golden Glory.	
A. tricolour: Most popular; red, yellow, green leaves.		ANNUAL LARKSPUR	
A. salicifolius (Fountain Plant): Tall stems with narrow drooping leaves; pink.		A.; 4 ft.; sow late summer, autumn, spring; sow direct and thin to 18 in.; winter and spring flowers; good cut flowers; apply complete fertiliser and water well; stake when young; sunny position, sheltered from wind.	
A. candelatus (Love-lies-bleeding): Green leaves and red flowers in long drooping spikes.		Delphinium Ajacis: Giant Imperial; Dwarf Rocket (double, mixed).	
A. hypochondriacus (Prince's Feather): Tall and branching, with oblong purplish-green leaves.		ANNUAL CYPRESS — See Kochia	
AMARYLLIS BELLADONNA (Belladonna Lily)	117	ANTIGNON	163
AMELANCHIER		ANTIRRHINUM (Snapdragon)	
A. sanguinea: D. (American June Berry); cold districts; dislikes lime; flowers white, berries dark; foliage glaucous green, crimson in autumn; 8 ft.		A.; h., 3-4 ft.; sow all year, but best in autumn, winter; transplant; thrive most localities; good drainage essential and avoid excessive watering; respond to lime; after transplanting avoid deep cultivation as the root system is extensive; pinch out the tops when 10 in. high; good beds and borders; excellent cut flowers; various rich colours; can be grown from cuttings.	
AMPELOPSIS	162		
ANCHUSA (Cape Forget-me-not; Blue Bird; Blue Gown)			
A.; 5 ft.; sow spring, autumn; very hardy; sunny position; self setting; free flowering; ideal background; blue blooms in graceful sprays.			
A. italica (Dropmore): P.; 5 ft.; purplish blue; useful in rockeries.			
A. capensis: 1½ ft.; indigo blue.			
ANDROMEDA (Pieris)	45, 205		
E.; small bushy shrubs; handsome foliage; lily of the valley-like flowers; half shade; keep moist in summer.			
A. calyculata nana (Dwarf Leather Leaf): 1 ft.; white heath-like spring flowers.			
A. japonica: Pendulous racemes; 3 ft.			
A. paniculata: D.; cream sweet flowers in spring; brilliant autumn tints.			

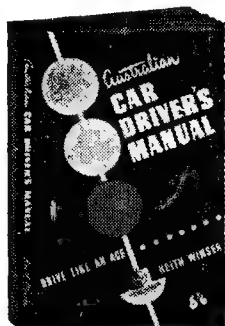
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A. maximum majus (Tall Giant): 36-48 in.; magnificent tall spikes of huge blooms.	ARDUINA
A. majus grandiflorum (semi-tall, rust resistant); 220-30 in. (Glorious, orange; Klondyke, golden; Rose Queen, pink; Autumn Tints; others).	A. hispinosa grandiflora (Cape Plum): E.; 6 ft.; beautiful shrub; scented white flowers and edible purple fruits.
A. nanum grandiflorum (semi-dwarf; giant flowers); 18-24 in. (Avalanche, pure white; Fire Dragon, scarlet; Golden Dawn, salmon).	ARENARIA (Sandwort) 151
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P. grown as Annual; sow autumn and spring; very graceful and exquisite colourings; long-spurred blooms carried on long stems well above the foliage; excellent for decorative vase work; splendid borders for large beds; hardy.	A. tuberosa orange: Summer flowers.
A. longissima: Long spurred, in pastel shades.	ASH — See Fraxinus
A. pyrenaica: Blue flowers; useful in rockeries.	ASHES — Wood, Coal 51
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A. sieboldi (Fatsia): E. shrub; 6 ft. glossy foliage; large clusters white autumn flowers.	ASTER 45
ARAUCARIA 188	A.; half h., 2½ ft.; early sowing in August in protected seed boxes; transplant out when frosts are over; protect seedlings from direct sun; in coastal areas continue sowing till January; most soils suitable; semi-shade; work top 12 in. well; roots are shallow; use organic matter; mulch surface in hot weather; water liberally; good as cut flowers; many varieties, many colours.
ARBUTUS 45, 198, 302	Californian Giants: Double flowers, 5 in. across.
A. Unedo (Irish Strawberry Tree): E.; 12 ft.; laurel foliage; white flowers; red strawberry-like fruit.	Giant Grego (wilt resistant): Early blooming; flowers 3 in. across.
ARCTOTIS grandis (Blue-eyed African Daisy; Bear's Ear)	American Beauty (wilt resistant): Early blooming.
A.; h., 2½ ft.; sow spring, summer; sow direct or transplant; sun-loving, quick-growing bush; fine borders; grey-green foliage; daisy flowers, white with blue inside; good for cutting; useful in sandy areas.	Super Giants (Los Angeles): Flowers 6 in. across.
ARDISIA 172	Tasmanian Branching: Early flowering; branched.
A. crenulata: E.; 2 ft.; pot plants, glass houses, shady gardens; laurel-like foliage; crimson berries in winter.	Heart of France (wilt resistant): Flowers rich red; branching.
	ASTILBE
	P.; Useful pot plants and indoor plants; rich moist soil; fern-like foliage; flowers in terminal panicles; several varieties.
	A. japonica is commonest; white. Others in cream and pink.
	ATHEL TREE — See Tamarix

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A.; creeping plant for edgings, rock- eries; sun and shade; cut after flowering; propagation by seed, layers and cuttings; several species in various colours.		AUTUMN CROCUS	117
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A. japonica aurea (Gold Dust Shrub): E.; 5 ft.; golden variegated foli- age; red berries; good pot plant; shady south position.		AVENS — See Geum	
A. japonica femina, A. japonica mas- cula: Grown together; E.; 5 ft.		AZALEA	45, 89, 172, 202, 205
AUDIBERTIA		Very hardy fibrous-rooted shrubs; thrive in all but hottest climate; prefer cool positions; lime-free soil; keep well watered; tall and medium shrubs; single and double flowers.	
A. incana: Hardy small E. shrub; thrives in common soil; blue flowers in winter.		A. indica: Large-flowered types.	
AUSTRALIAN EDELWEISS — See Actinotus		A. Kurume: Dwarf types; for bor- ders.	
		AZARA	
		A. microphylla: E.; 8 ft.; graceful shrub with yellow flowers.	

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BABIANA (Baboon Root)	118	BALSAM (Impatiens Balsamina)	
BABY'S BREATH — See Gypsophila		P. and A.; h., 18 in.; sow spring, summer, transplant shady position; frost sensitive; rich soil, ample water; bushy; suitable beds, pots; whole plant usually taken when cutting; bright double flowers in red, pink, white; fleshy stems; shining green leaves.	
BACKHOUSIA		Camellia - flowered: Large double flowers.	
B. citriodora: E.; 15 ft.; dense foliage with lemon scent; green flowers; suitable most areas with sun and moisture.		Bush - flowering: Double flowers.	
BAECKIA	45, 211	I. Sultani, P.: Bright rose.	
B. virgata: E.; Willi-Willi bush; 6 ft.; small white spring flowers; thrives anywhere.			



BIGNONIA LINDLEYANA

BAMBOO	
Thrive in deep soil with moisture - rapid growers.	
Bambusa japonica: E.; 10 ft.; deco- rative plume foliage.	
Bambusa nigra: E.; 10 ft.; small foliage; black stems.	
Arundinaria japonica (Metake): 10 ft.; in any situation.	
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BARRENWORT (Epimedium)	
P.; 12 in.; rock gardens and ground cover; handsome coloured foliage when young and very attractive spring flowers; requires moist rich soil; plant in shade in spring or autumn, the crowns 9 in. apart just above surface; various colours.	

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BAUERA

B. rubioides: E.; 6 ft.; graceful shrub; small pink flowers in spring; semi shade and moist position.

BAUHINIA (E. Tropical legumes)

B. alba: 12 ft.; pure white flowers.
B. Galpini: 8 ft.; brick red flowers.
B. purpurea: 15 ft.; purple flowers.
B. Hookeri: Tree 40 ft.; spreading head with large white flowers.
 Prune *B. alba* and *purpurea* after flowering.

BAY TREE — See Laurus

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BEAR'S EAR — See Arctotis

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BEAUFORTIA

B. sparsa: Dwarf E.; 3 ft.; neat foliage; showy red spring flowers.

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Protected semi-shade position; moist rich soil; frost susceptible. Tuberous-rooted: Pot plants, hot-houses, indoors. Fibrous-rooted (Bedding Begonias): Plant out in beds. Propagate by cuttings, root division. Tree types: Corralina, 6 ft., pink; Beatrice Rosebery, 6 ft., pink; Metallica, 6 ft., pink; Lucerna, 3 ft., red.

BELL FLOWER — See Canterbury Bells

BELLADONNA LILY 117

BELLIS perennis (English Daisy)

P.; 6 in.; grown as annual; sow autumn; flower from seed first season; moist, semi-shade position. Dwarf border plant; colours red, white, lilac.
B. etna: Rich red; quilted giant flowers.
B. Monstrosa: Crimson, deep red.

BELLWORT (Uvalaria)

P.; 1½ ft.; easy to grow in shady places; rock gardens, borders; rich organic soil; propagate by division in autumn or by seeds in spring or summer; flowers are solitary and terminal.

BENTHAMIA fragifera — See Cornus capitata

BERBERIS (Barberry) 45, 198, 202

Hardy E. and D. shrubs; spiny; yellow and orange flowers in spring, summer; coloured berries; good autumn tints; thrive most places; best in cool hills.
B. Thunbergi atropurpurea: D., 3 ft. good dwarf hedges; red berries.
B. Darwini: E., 6 ft.; good hedges in cool districts; rich orange flowers.



BROWALLIA JAMESONII

Page

B. Sargentiana: E., 6 ft.; hardy; bronze-scarlet autumn foliage; black fruit; ivory spines.
B. Wilsonae: Low spreading, 2½ ft.; semi-dwarf; needle-like spines; dense crops red berries.

BETULA (Silver Birch) 45, 183

B. alba: D., 30 ft.; ornamental white bark; golden autumn foliage; for cool climates.

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BLADDER POD

P., 12 in.; dwarf; seed pods like bladders; rockeries and borders.

BLANKET FLOWER — See Gaillardia

BLAZING STAR (Liatris)

P.; very hardy in poorest soils; propagate from seed or by root division.
L. spicata: Flowering stems to 3 ft. with dense spikes of mauve flowers.

BLEEDING HEART (Dicentra; also called Dielytra)

P.; moist organic soil in semi-shade; attractive leaves; heart-shaped drooping flowers; propagate by root division.
D. spectabilis: Pink spring flowers.

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<i>B. Humboldtii</i> : White tubular perfumed flowers.	
<i>B. President Cleveland</i> : Single scarlet flowers.	
<i>B. President Garfield</i> : Double salmon pink flowers.	
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Handsome E. trees; pyramid shape; valuable hot, dry areas.	
<i>B. acerfolia</i> (Illawarra Flame Tree): E., 30 ft.; splendid tree; profuse scarlet flowers; shining foliage.	
<i>B. diversifolia</i> (Kurrajong): E., 60 ft.; drought-resistant; edible fruits; white flowers.	
<i>B. rupestris</i> (Barrel Tree): Water from swollen trunk base; seeds, leaves and roots edible; northern dry inland; 50 ft.	
BRACHYCOME <i>iberidifolia</i> (Swan River Daisy)	
A. and P.: 1 ft.; sow spring; flowers single, blue, pink and white; like daisies; hardy, graceful plant; blooms throughout summer.	
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<i>B. Jamesoni</i> : E., 5 ft.; decorative foliage; orange flowers; warm situation; prune hard after flowering.	
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<i>B. Sanguinea</i> : Dwarf; coastal. Both are frost sensitive.	

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B. aurea marginatus: Golden variegated; 3 ft.	
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Campfire Improved: Exceptionally long stems; many blooms from one plant; deep orange, scarlet sheen on upper sides of petals; strong growers.	
Chrysanth Type: Loosely-built flowers with incurved crossing petals, on long stems; suitable for indoor decoration (Golden Delight, Orange Sunshine).	
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C. speciosus: 15 ft., prickly needle leaves; cool conditions; shrub size in south of Australia.	
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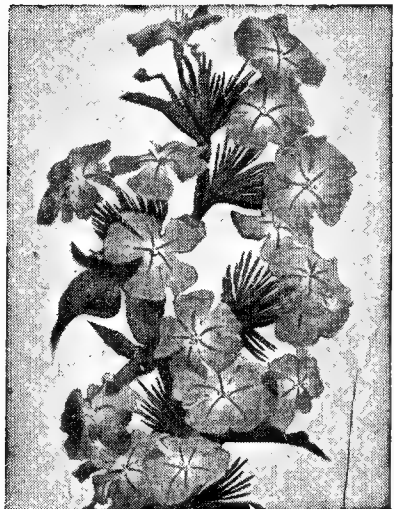
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Hyacinth flowered types: Much branched,, each branch with long dense spikes of white flowers; Dobbie's, Empress, White Rocket, Giant Hyacinth flowered.	
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Tall growing varieties: Up to 5 ft: <i>C. pyramidalis</i> (Chimney Bell-flower); <i>C. glomerata</i> , 18 in.; <i>C. persicifolia</i> ; winter root division.	
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CAPSICUM (Ornamental Chili or Pepper)	
P., 18 in.; sow autumn, spring; ornamental fruits; for bedding in masses or spacing singly in beds; also for pots. C. celestial: Fruits white, turning purple, orange, scarlet.	
CARDINAL FLOWER — See Lobelia	
CARNATIONS (Dianthus coryophyllus)	
Carnations grow best when light intensity is high and the night temperature not over 50 deg. F. They are evergreens and need only a small amount of growing space, and are very hardy; can be grown in all soil types from heavy clay to sand, although a sandy loam rich in humus is the best.	
Propagation: Can be propagated from terminal cuttings, leaf-bud cuttings, seeds, and by stem layering. A range of types is obtained from seeds, but if properly designed crosses are made a control can be effected over the types which result. Leaf-bud cuttings are valuable for increasing stocks of a new seedling quickly; terminal cuttings are used most commonly and consist of the side shoots on the stems. These side shoots are broken out and rooted in moist sand or loam in a warm, shady place.	
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E. shrubs; attractive, with yellow blooms; frost sensitive; prune after flowering.	
C. Candolleana: 10 ft.; rapid grower; abundant flowers autumn.	
C. didmobotrya: 6 ft.; summer flowers.	
C. artemisoides; 5 ft.; yellow flowers, winter, spring.	
C. tomentosa: 8 ft.; rich yellow.	
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C. australe (Morton Bay Chestnut): E., 30 ft.; a native gem; large attractive foliage; conspicuous orange flowers.	

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CERATOSTIGMA WILLMOTTIAE

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C. cristata (Crested Cockscomb): Large ornamental comb-like heads; good for summer beds; fine pot plants; yellow, orange, crimson, purple red; open, warm position.		C. purpureum: E., 6 ft.; pendulous growth and red flowers over long period; frost tender.	
C. pyramidalis (C. Argenta) (Feathered Cockscomb; Flame of Fire): Large fiery head of coral-like structure (also called C. Thompsoni). Useful cut flower; dried for winter decoration.		CHAENOMELES (Flowering Quince)	
C. cristata: Dense head, twisted, with flat stems; both green and variegated leaves; flowers yellow to crimson; sow for massed effects.		C. lagenaria: Hardy, semi-D.; broad spreading, with spiny interlacing branches; dark glossy leaves; winter-spring flowers.	
CELTIS		C.l. nivalis: D., 5 ft.; pure white.	
C. australis (Nettle Tree): D., 40 ft.; ornamental; most areas.		C.l. Winter Cheer: D., 6 ft.; orange, scarlet; double flowers.	
C. sinensis (Chinese Cedar): D., 40 ft.; beautiful pink young foliage; good in hot inland.		C.l. coccinea: D., 5 ft.; red.	
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A.; h. 2½ ft.; sow autumn; transplant or sow direct; suitable beds, borders, cutting; large double blooms on long stems; succeeds anywhere.		CHAMAELAUCIUM	45, 213, 253
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C. moschata (imperialis) (Sweet Sultan): Mauve, pink, yellow, white.		CHEIRANTHUS (Wallflower)	
C. suaveolens: Yellow.		P.; h., 12 in.-2 ft.; grown as annual for autumn, winter, spring flowers; sow late summer, autumn; transplant 12 in. apart; semi-shade and open position; light rich soil, limed; needs low temperature for bud formation; good for massing; useful cut flower, scented; colours, brown, primrose, mauve.	
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C. plumbaginoides (Lead Wort): Low shrub, 12 in.; excellent rockeries and edges; rich blue flowers in summer, autumn.		CHINESE FORGET-ME-NOT — See <i>Cynoglossum</i>	
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A.; h., 18 in.; sow late summer, early autumn; sow in shaded boxes; transplant to light soil with well mixed decayed organic mat- ter; thrive in semi-shade; useful under tall evergreens and deci- duous trees; unsurpassed for massed beds and as backgrounds; good house plants.	
<i>C. hybrida grandiflora</i> : 2½ ft.	
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Chieftain.	
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C. <i>horizontalis</i> : 2 ft.; spreading; rockeries.	
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C. <i>cordata</i> : Excellent autumn foliage.	
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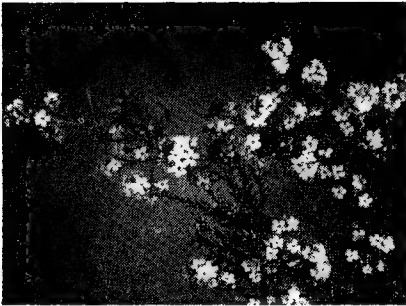
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Beautiful Irish Heath; spreading habit; 18 in.; masses of hanging bell flowers all year; moist, cool, good soil.	
D. <i>polifolia</i> alba: Pure white.	
D. <i>polifolia</i> <i>atropurpurea</i> : Rich purple.	
DACRYDIUM	189
DAEDALACANTHUS	
D. <i>nervosus</i> : E., 3 ft.; hardy shrub; blue flowers.	
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DAISY — See <i>Bellis</i>	
See <i>Michaelmas Daisy</i>	
See <i>Easter Daisy</i>	
DAPHNE	45, 89, 154, 199, 253
E., 4 ft.; winter and spring flowers; sheltered position, cool and moist; large pots.	
D. <i>odora</i> (<i>indica rubra</i>): Pink flowers, fragrant.	
D. <i>odora</i> alba: White winter flowers.	
DECIDUOUS FRUITS — PRUNING	240

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DIOSMA PULCHRA

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DECIDUOUS TREES 183

DELPHINIUM (Perennial Larkspur)

Sow in February for best results; plant out seedlings in September. A space of 30 in. to 36 in. should be allowed between plants. An open sunny position is desirable for delphiniums. They thrive in a deep, rich, well-drained soil liberally supplied with rotted manure; in addition a complete fertiliser containing phosphate, potash and nitrogen should be applied during growth.

DESMODIUM

D. penduliflorum: Hardy semi-D.; pendulous habit; purple pea flowers in long spikes, summer and autumn; effective for coloured winter foliage; prune in winter.

DEUTZIA 45, 89, 195

D., dwarf spring flowering; thrive in most places.
D. rosea: 6 ft.; double white and pink flowers.
Pride of Rochester: Double white.

DIANTHUS 89, 151

P. dwarf, similar to carnations; brilliant colours; for beds, borders, rockeries, edges and cut flowers; flowers of different forms, up to 3 in. across; easily grown, especially in good loam; grow in semi-shade; water well.
D. plumarius (Border Pinks): P.; useful edgings, rockeries.
D. deltoides (Meadow Pink): Pink rockery plant.
Mrs. Sinkins: Double white.
Mrs. Only: Mauve.
D. chinensis (Chinese Pinks): B., grown as A.; sow from seed each year.
D. Heddwigii, D.c. lacinatus: both in single and double flowers.
D. barbatus (Sweet William): B.; sow seed in spring and transplant to permanent bed next spring.

DICHONDRA REPENS 71

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DIOSCIA

P., grown as A.; 9 in.; rockery plant, resembling Nemesia; inconspicuous stems and leaves, but open salmon pink flowers in terminal racemes. D. barberae for mild and cool climates; summer blooming.

DICENTRA — See Bleeding Heart

DICTIONARY OF PLANTS 301

DIDISCUS (West Aust. Lace Flower; Lace Flower)

A., 2 ft.; sow autumn, spring.
D. coerulus (Blue Lace Flower): Umbel-shaped clusters of blue flowers in summer and autumn; gracefully dissected leaves; splendid cut flowers; grow in sunny, well-drained position.

DIELYTRA — See Bleeding Heart

DIERVILLA — See Weiglea

DIGITALIS (Foxglove)

B.; h., 4 ft.; sow early autumn, otherwise they do not flower until the second year; robust and shapely; good as backgrounds; likes semi-shade and plenty of space; grows well under trees.
D. purpurea: White, purplish and pink flowers in long spikes.

DIMORPOTHECA (Star of the Veldt; Cape Marigold) 45

A., P.; sow spring; showy flowers for massed beds and edges; daisy-like, standing above foliage; quick to bloom, in rich colours; open position.
D. aurantica hybrida: A., 12 in.; pure white; sow autumn, spring.
D. ecklonis: P.; sow early summer, spring; white with blue ring inside flowers.

DIOSMA (Breath of Heaven) 45, 199

D. pulchra: E., 4 ft.; compact and useful for ornamentals; thrive most places; prune heavily after flowering.
D. alba: White.

DIPLACUS

D. hybrida: E., 2 ft.; soft-wooded with bell-shaped orange flowers; thrives in good soil.
Mrs. Scholes: E., 2 ft.; profuse crimson blooms; cut back occasionally; thrives in good soil.

DISEASES 277

DODONAEA (Purple-leaved Hop Bush)

D. viscosa purpurea: E. shrub, 6 ft.; bronze foliage, purple in winter; ideal mountains.

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DOGWOOD — See <i>Cornus</i>	
DOMBEYA	
<i>D. natalensis</i> : Hardy E., 6 ft.; handsome white buttercup-like winter flowers.	
DRACAENA	
<i>D. australis</i> : E., 10 ft.; ornamental slender palm-like foliage; suitable pots.	
<i>D. draco</i> (Dragon's Blood Tree): E., 10 ft.; bronzy foliage.	
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E. shrubs; ideal hedges; flowers most of year; yellow berries in autumn; sunny position.	

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<i>D. alba</i> : E., 8 ft.; white flowers, orange berries.	
<i>D. plumieri</i> : E., 8 ft.; dense; blue flowers.	
<i>D. plumieri variegata</i> : E., 6 ft.; blue flowers.	
DUSTY MILLER	
P. plants with woolly whitish foliage. <i>Centaurea Cineraria</i> (3 ft.), <i>Senecio Cineraria</i> (3 ft.); semi-shade; grown for foliage and flowers; sow late spring directly into beds; thin to 18 in.	
DWARF MARIGOLD (<i>Tagetes signata</i>)	
A., 6 in.; used in massed edges; small yellow flowers; branched and bushy plant.	

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EASTER DAISY — See <i>Perennial Aster</i>	
EDELWEISS	
<i>Leontopodium alpinum</i> (Swiss Edelweiss): Light limed soils in cool places; summer blooming; soft-petalled white flowers.	
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<i>E. cyaneus</i> (Blueberry Ash): E., 20 ft.; graceful native tree; white flowers in sprays; blue berries.	
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Hardy dwarf shrubs; cool climates; drained sandy and peaty soils best; acid loving; keep well watered.	
<i>E. autumnalis</i> : 3 ft.; rose pink; autumn.	
<i>E. melanthera</i> : 4 ft.; purple winter flowers.	
<i>E. arborea</i> : 5 ft.; small white flowers.	
<i>E. Wilmoreana</i> : 4 ft.; winter flowers, pink and white.	
<i>E. cinera</i> : 4 ft.; orange red; long spikes.	
<i>E. Darleysensis</i> : 1 ft.; pink.	

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ERIGERON (Fleabane)	
P.; dwarf compact bushes, 18 in. high; prolific flowerers; useful in edgings, rockeries; hardy; flowers similar to asters, on single or branched stems; various colours, commonly with yellow centres.	
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<i>E. nerifolium</i> : E., 5 ft.; compact, beautiful native shrub; pink starry winter flowers.	
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<i>E. amethystinum</i> : Holly-like spiny leaves with metallic sheen and thistle-like flowers of blue; good for edges and cut flowers; 2 ft.; open position and light sandy soil; propagate by seeds or cuttings. Two other species.	
ERYTHRINA (Coral Tree)	45
Tropical shrubs and trees; pea-shaped flowers in spikes; warm position.	
<i>E. acanthocarpa</i> : D., 8 ft.; beautiful.	
<i>E. cristagalli</i> (Tree Cockscornb): D., 12 ft.; rich scarlet; hard pruning in winter.	
<i>E. indica</i> (Coral Tree): D., 30 ft.; spreading; winter crimson flowers; hard pruning in winter.	
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E. shrubs, 6 ft.; glossy foliage; bell-shaped flowers in summer; hardy in all positions and soils; good for seaside.	
C. F. Ball: E., 8 ft.; bright rosy-crimson.	
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<i>E. Montevidensis</i> : E., 8 ft.; white flowers.	

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FAIRY PRIMROSE — See *Primula*

FAGUS 183

FALSE INDIGO (*Baptisia*)

P. Sturdy and bushy; 4 ft.; summer flowers in spikes like lupins; thrives in semi-shade or open sun in ordinary soil. Requires little cultivation; propagate by division or seeds.

B. *alba*: White.

B. *australis*: Commonest; dwarf; blue flowers.

FAREWELL TO SPRING —
See *Godetia*

FATSIA — See *Aralia*

FEATHERED COCKSCOMB — See
Celosia

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EUPATORIUM (Mist Flower)

P. Shrub with soft leaves and very large heads of mauve flowers, similar to ageratums; suited only to frost-free areas. *E. ianthium* and *E. megalophyllum*: Prune after flowering.

EUPHORBIA 155

Hardy, especially in hot places.

E. splendens (Crown of Thorns): *E.*, 4 ft.; strong thorns; crimson flowers all year.

E. wulfenii: *E.*, 4 ft.; very hardy; dense clump with bluish leaves; Useful planting under trees.

E. fulgens: *E.*, 4 ft.; frost sensitive; brilliant orange flowers in winter.

E. pulcherrima (Poinsettia): *E.*, 4-10 ft.; glorious in tropics only; in south for hot-houses; cuttings root easily.

EVENING PRIMROSE (Oenothera)

P. Tall plants with fragrant large pale yellow flowers, opening in the evening; can become weeds; several species; thrive in good moist loam, semi-shade. *O. coespitosa*, 1 ft.; *O. biennis*, 5 ft.; *O. missouriensis* is prostrate; useful in rockeries, with reddish stems and large flowers.

EVENING SCENTED STOCK — See *Matthiola*

EVERLASTING — See *Helychrisum*
See *Gomphrena*

EXOCHORDA (Pearl Bush)

E. grandiflora: D., 8 ft.; profuse white flowers in spring; charming shrub.

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FELJOA	45, 199
F. <i>Sellowiana</i> : E., 8 ft.; dark green	
folliage; crimson flowers in spring;	
large edible fruits; grows well	
under trees.	
F. <i>Sellowiana choiceana</i> : E., 10 ft.;	
larger flowers and fruits; needs	
another variety to pollinate.	
FELICIA	45, 89, 199
F. <i>angustifolia</i> : E., 3 ft.; hardy	
shrub; countless small lilac flowers	
in spring; warm position; thrives	
on dry banks and borders.	
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E. Shade and fodder trees; thrive	
in poor soils; frost tender when	
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<i>F. australis variegata</i> : 8 ft.; variegated foliage.		FLOWERING CURRANT — See <i>Ribes sanguineum</i>	
<i>F. Hilli</i> : 30 ft.; pendulous branches.		FLOWERING PEACH — See <i>Prunus Persica</i>	
<i>F. macrophylla</i> (Moreton Bay Fig): 50 ft.; large spreading; useful in hot districts.		FLOWERING PLUM — See <i>Prunus</i>	
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FIG — See <i>Ficus</i>		FOAM FLOWER (<i>Tiarella Cordifolia</i>)	
FLAME FLOWER — See <i>Kniphofia</i>		P.; hardy; for woodlands, rock gardens and ground cover; height 1 ft.; foliage green or purple: Flowers soft white feathery plumes in early summer; plant spring or autumn, 9-12 in. apart in rich moist soil; location shaded; divide and replant whenever the plants show signs of deterioration.	
FLAME NETTLE — See <i>Coleus</i>		FOOD VALUE TABLE	276
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FLORAL ART	126	<i>F. intermedia spectabilis</i> : 5 ft.	
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FLOWERING APRICOT — See <i>Prunus Mume</i>			

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D.; ornamentals; green foliage, yellow and purple in autumn; thrive in deep, moderately rich, moist soil; hardy; prefer cool climate.	
F. americana (White Ash): 60 ft.	
F. excelsior (English Ash): 30 ft.	
F. excelsior aurea (Golden Ash): Dwarf;; golden branches.	
F. ornus (Flowering Ash): 20 ft.; white flowers.	
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FRENCH FORGET-ME-NOT — See <i>Virginian Stock</i>	
FRENCH MARIGOLD (<i>Tagetes patula</i>)	
A.; half-hardy; 1-2 ft.; sow summer, autumn; transplant to sunny position; winter flowering; best in medium rich soil only; well branched; good cut flowers.	

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Double Dwarf: 12 in.; shades of yellow, brown, orange.	
Double Tall (Giant Tree M.): 4 ft.; abundant long-stemmed brown and gold flowers.	
Tall Single: 2 ft.; long-stemmed flowers 2 in. across; various hues of red, yellow.	
Flaming Fire: Single flowers, orange and yellow; very free flowering.	
FRENCH PINK — See <i>Centaurea</i>	
FROG FRUIT — See <i>Lippia</i>	
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Hardy shrubs; garden or bush house, or trained against fences; prefer rich soil, sheltered from wind and heat; keep moist.	
F. gracilis variegata: Attractive dwarf; small green leaves marked with white.	
F. pumila: Dwarf, 15 in.; pendant flowers; useful rockery.	
FUGOSIA (Pyramid Tree)	45
F. Patersoni: E.; pyramidal shape; 30 ft.; thrives in poor acid soil.	

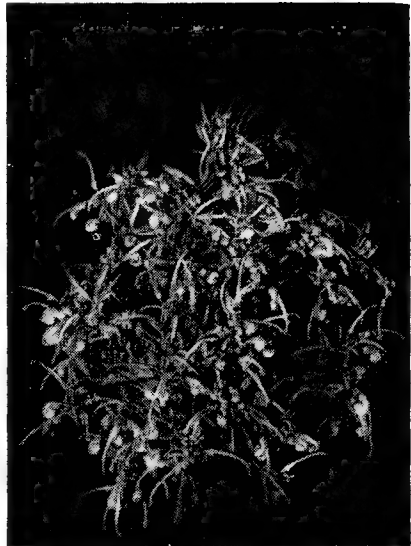
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GAILLARDIA (Blanket Flower)	
P., A.; h., 2 ft.; sow autumn, spring; particularly hardy plants, thriving in open positions; transplant out; bloom first year from seed; good cut flowers.	
G. lorenziana: A.; large double flowers; tubular quilled petals of red and yellow; useful dry conditions.	
G. grandiflora: P.; large red and yellow flowers.	
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Glossy foliage; profuse perfumed white flowers; good soil and ample water; frost susceptible; use blood and bone fertiliser.	
G. florida: Best dwarf type; E., 3 ft.	
G. magnifica grandiflora: Double large blooms, up to 5 in.; E., 4 ft.; foliage large, glossy.	
GARRYA (Catkin Shrub)	45, 200
G. elliptica: E., 8 ft.; in winter drooping catkins of green flowers on male tree; ornamental.	

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GAUZE FLOWER — See <i>Gypsophila</i>	
GAZANIA (Treasure Flower)	
P. Lowly growing, with brilliant orange daisy flowers in summer; rapid growers; useful in exposed dry and hot positions; propagate by cuttings or division.	
GENISTA (Broom)	200
See <i>Cytisus</i> ; <i>Spartium</i>	
Hardy shrubs; E.; thrive in most soils and conditions.	
G. fragrans: 6 ft.; compact; golden spring flowers.	
G. florida: 5 ft.; dense, bushy growth.	
G. tinctoria flore pleno: Prostrate, 2 ft.; ideal rockeries.	
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Hardy perennials. For wild gardens and rock gardens; many are high alpine plants that resent hot weather; well-drained moderately moist soil with leaf mould and very old rotted manure.	
GERANIUM	152
There are two very distinct kinds of plants—varieties of pelargonium, and a group of hardy perennials with white, pink, red or blue flowers that represent the geranium of the botanists and are for rock gardens and borders. The tender or bedding kinds have flowers white, pink or red. Propagate by cutting in autumn or mid-winter. Grow young plants in pots in sunny places indoors; pinch shoots occasionally to induce bushiness.	

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P.; sow spring and early summer; one of our most beautiful garden perennials, and very useful as cut flowers; flowers borne on long, wiry stems, the colours comprising salmons, pinks, reds, yellows and their variations. To grow to perfection, choose a sunny, well-drained situation and deeply trenched rich loam. Single and double varieties.	
GEUM (Avens)	
P. grown as A.; sow late summer, autumn and spring; hardy; produce dwarf tufted plants from which rise graceful stems 2 ft. high, bearing beautiful double flowers which are borne freely throughout the entire summer; valuable cut flowers; easily grown in any good soil; water well.	
Lady Stratheden: Fine double yellow.	
Mrs. Bradshaw: Beautiful double crimson-scarlet flowers.	
Several other varieties and species.	
GERMAN CATCHFLY — See <i>Viscaria</i>	
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P.; sow autumn; tuberous rooted; tender; one of most beautiful pot plants for green-house, hot-house; can be sown from seed and then flowers within six months.	
GODETIA (Farewell-to-Spring)	
A.; h., 2 in.-2 ft.; sow autumn, spring; transplant; good massed display; grow in poorest soil; semi-shade; very hardy in dry seasons; beautiful satin-like blooms with striking rich blotches; last well as cut flowers.	
Tall Double or Schamini types, 2 ft.: Crimson, Cherry Red, Deep Rose, Rosy Morn, Mixed.	
Dwarf Double Types, 18 in., azalea-like flowers: Bedding, tubs and pots (Azalea Show, Sybil Sherwood).	
Dwarf Single Types, 15 in.: Kelvedon Glory, Mixed.	



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GOLDEN ROD (<i>Solidago</i>)	
P.; tall herbaceous plant needing sun; upright shoots bearing tasseled spikes of golden flowers; propagate by seeds in spring, or by root division in autumn. Several species.	
GOLDEN TUFT — See Alyssum	
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G. anisophylla: E., 3 ft.; compact shrub; bronze-purple foliage; lavender bell flowers; protect from frost.	
GOMPHRENA GLOBOSA (Globe Amaranth; Everlasting)	
A.; h., 12 in.; sow spring, early summer; transplant; clover-like strappy flower, heads $\frac{1}{2}$ in. across; flower summer to autumn; fine for borders and cut flowers; mixed colours. Can be dried for winter decoration.	
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Handsome natives; attractive spring flowers and foliage; shrub types benefit by pruning; thrive in poor soils.	
<i>G. asplenifolia</i> : 6 ft.; crimson flowers, dark leaves.	
<i>G. oleoides dimorpha</i> : 3 ft.; crimson flowers in winter, spring; olive-like foliage.	
<i>G. robusta</i> (Silky Oak): 50 ft.; handsome foliage, orange flowers; resistant to heat and drought.	
<i>G. rosmarinifolia</i> : 6 ft.; good hedge for poor soils.	
<i>G. Banksi Fosteri</i> : 8 ft.; frost tender; flowers all year; light graceful foliage.	
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<i>G. heterophylla</i> : E., 8 ft.; spreading shrub; blue flowers.	

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<i>G. Sutherlandi</i> : Hardy shrub; naked branches; foliage at ends; flowers in spikes of scarlet; warm and well-drained position; 8 ft.	
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<i>P. and A.</i> : h., 18 in.; sow direct and thin out to 9 in. Bell-shaped blooms; mixed with other flowers in vases and bouquets; easily grown in any limed soil; quick growing; sow at fortnightly intervals.	
Annual varieties: <i>G. elegans grandiflora</i> (Gauze Flower), white, rose and pink.	
<i>G. elegans</i> (Chalk Plant), 1½ ft. Branched; white flowers.	
Perennial varieties: Sow autumn. <i>G. paniculata</i> (Baby's Breath), white; <i>G. cerastoides</i> , creeping, large white and lilac flowers.	

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Hardy E. natives; thrive in poor dry soils.	
<i>H. eucalyptoides</i> (Pincushion Shrubs): 8 ft.; crimson flowers.	
<i>H. saligna</i> : 15 ft.; beautiful bronze foliage; hedges. Many others.	
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<i>H. caffrum</i> (Kaffir Plum): E., 30 ft.; magnificent spreading crown; new foliage is bronze-red.	
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Useful perennials, producing large heads of flowers during summer and autumn; very suitable for cutting; they like rich moist soil and a sunny, open position; propagation by division; several species in various colours.	

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HELIANTHUS (Sunflower)	
<i>A.</i> , 6-9 ft.; sow spring, summer; easily grown; prefers light rich soil; use lime; tall, rapid growers; effective as screens, backgrounds, and in combination with shrubbery; large-scale decoration.	
<i>H. annus</i> : Common sunflower; 9 ft.; huge heads.	
<i>H.a. californicus</i> : Large double heads.	
<i>H.a. purpureus</i> : Small centres; red-dish-orange; red hybrids.	
HELYCHRISUM (Everlasting)	
<i>A.</i> , <i>P.</i> , 3 ft.; sow autumn, spring; widely grown; grows in all hard conditions; cut blooms and hang to dry for useful winter decoration; hybrid varieties; large single heads; colours yellow, salmon, scarlet.	
HELIOTROPIUM	45
<i>E.</i> shrub; dwarfs; sweet-scented flowers; useful in rockeries.	
<i>H. hybridum</i> : 3 ft.; deep green leaves; purple flowers.	
<i>H. aureum</i> : 3 ft.; golden foliage; blue flowers.	
HELIOTROPIUM (Heliotrope; Cherry Pie)	
<i>P.</i> , 3 ft.; sow autumn, spring; sow in frame; transplant; delicious perfume; tender plants; useful for borders; dark and light colours.	

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Hardy evergreen perennials with single rose-like flowers, produced freely from May to September; thrive in shady positions in any ordinary garden soil enriched with manure; can be planted throughout the year; the flowers, when cut, last for three or four weeks in water, provided the ends are split; various colours.		P., hardy; blooms freely early summer; useful borders and cutting; flower spikes 12-18 in. tall; full sun and a light moderately rich, well-drained soil suits best; divide every third year; fertilise each spring; propagate by division, spring or autumn.	
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HERBS	273	P.; sow autumn, spring; hardy in all conditions and soils; good for borders and rockeries; bell-shaped flowers, borne on long wiry stems; ideal table decoration.	
HERNIARIA (Rupture Wort)	152	H. sanguinea: Graceful spikes.	
P. Forms covering mat of pretty green foliage over stone walls and paths and rockeries; dark green leaves.		H. sanguinea splendens: Vermillion red.	
HETEROPAPPUS (Blue Daisy)		HIBISCUS	45, 89, 197, 200
Sow spring, early summer.		E. and D.; evergreens; have beautiful flowers; for warm climates only; prune them heavily early spring; rich soil.	
H. hispidus: Fine annual for late summer and autumn flowering; symmetrical plants, 2 to 2½ ft. high, are covered with marguerite-like flowers 1½ in. across, of silvery lavender blue with bright gold centres.		H. Agnes Galt: E., 8 ft.; strong grower.	
		H. Wilder's White: E., 8 ft.; white flowers.	
		Many varieties of evergreens.	
		H. mutabilis (Rose of Sharon): D., 8 ft.; double white flowers.	



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<i>H. syriacus</i> (Syrian Rose): D., 10 ft.; hardy; double and single varieties; decid. varieties for cooler climates. Herbaceous species, P., useful for backgrounds, in sun or shade: <i>H. moschentos</i> , <i>H. vitifolius</i> .	
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HOLLYHOCK (<i>Althaea rosea</i>)	
A., 6 ft.; sow autumn; easily grown; transplant 2 ft. apart in sunny position; liable to rust fungus; single and double varieties in red, pink, yellow, white.	
HOLMSKOLDIA	
<i>H. sanguinea</i> : E., 8 ft.; outstanding shrub; arching growth; tango flowers; frost susceptible.	
HONESTY — See <i>Lunaria annua</i>	
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P.; sow autumn; flower from seed in first year; hardy; useful in borders; excellent for cut flowers; spreading and divided leaves.	

<i>H. fumariaeifolia</i> : Bushy; large yellow tulip-shaped flowers.	Page
HYACINTH (<i>Hyacinthus orientalis</i>)	111
HYDRANGEA	
Chief requirements: Protection from hot sun, ample water in spring, summer. Garden plants and pot plants: prune dwarf and medium growers by thinning old flowered stems in late summer; tall growers to be cut hard every second season, in summer; colour varies according to soil pH; alkaline soil produces pinks and reds; acid and ironstone produces blues and purples; pinks and reds are normal colours.	
<i>H. macrophylla</i> (<i>hortensis</i>): E.; summer flowers; many varieties: Caroline, tall, robust serrated petals; Parsifal, medium, serrated petals.	
<i>H. paniculata</i> : D., 10 ft.; tree-like; handsome heads; prune early spring; summer, autumn flowers.	
HYMENOSPORUM	
<i>H. flavum</i> (Native Daphne): E., 20 ft.; sweet-scented flowers; shiny green foliage.	
HYPERICUM (St. John's Wort)	
. 45, 89, 155, 200, 204	
Dwarf hardy shrubs; abundant yellow flowers in spring; prune hard in winter. These varieties are not weeds.	
<i>H. moserianum</i> : E., 3 ft.; compact growth.	
<i>H. moserianum</i> : E., 3 ft.; variegated foliage; good for rockeries.	
<i>H. patulum</i> Henryi: E., 4 ft.; yellow flowers; bushy.	
<i>H. chinense</i> : 2 ft.; frost sensitive.	

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IBERIS — See <i>Candytuft</i>	
ICELAND POPPY (<i>Papaver nudicaule</i>)	
Seed boxes should be prepared, watered, then left for an hour to drain. As the seed is very fine, it should be mixed with equal quantities of sand or sandy loam to ensure even distribution. Press the seed slightly into the soil of the seed box with a piece of glass a little smaller than the size of the box, and cover with just the finest layer of sandy loam. Place the box in sheltered situation and keep well moistened. When the seedlings are large enough to handle, prick them out into other prepared boxes or into the open ground, sheltering the young plants from the sun with twigs or tiny branchlets until they are sufficiently established. When enor-	

mous blooms are required, seedlings must be transplanted into rich ground that will not cake or become hard. For winter blooming a sunny situation is essential.

Improved Coonara: Range from silver-pink through shell, salmon, rose, cerise to pretty tomato red. Crimped petals with opalescent sheen that receives instant admiration; large flowers on long stems; superb.

Orange Supreme: Extremely large cupped flowers of richest orange self and with amazing silky sheen that places this variety far ahead of anything yet offered in this class. Long, rigid stems carry the blooms proudly, and dense foliage acts as a pleasing foil to the vivid colours of the flowers.

Gartford Giants: Very large blooms; tango, yellow, lemon, lime, buff.

Improved Sunbeam: Large flowers on long stout stems; many art tints.

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I. polycarpa: D., 12 ft.; rapid grower; handsome foliage; rich autumn colours; small green flowers, red berries.	
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I. aquifolium (English Holly): E. spiny shrub; attractive red winter berries; cool moist soil.	
I. aquifolium alba marginata: E., 10 ft.; variegated silver leaves.	
I. aquifolium aurea variegata: E., 10 ft.; golden variegated leaves.	
ILLAWARRA FLAME TREE — See Brachychiton	
IMPATIENS — See Balsam	
INCARVILLEA (Pride of China)	
P., 3 ft.; foliage fern-like; sunny aspect and deep rich soil; propagation by seeds or root division in spring; cool to cold climates.	
I. Delavayi: Pink.	
I. grandiflora: Small, for rockeries; flowers red.	
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IOCHROMA	
I. grandiflora: E., 8 ft.; vigorous spreading shrub; lilac tubular flowers in clusters; prune severely.	

IPOMEA (Morning Glory)	89, 161
P.; sow autumn and spring. The most free-flowering and rapid climber in cultivation; ideal for covering fences, pergolas, etc.; a veritable sheet of colour when in bloom; thrives best in warm weather.	
Bona Nox: Throat purple, shading to lavender; night flowering; favourite in moonlight garden.	
Heavenly Blue: Deep sky blue, light at centre; early flowering.	
Mikado: Larger-flowered than above; wide range of unusual colours and unique markings.	
Scarlet O'Hara: Vivid scarlet "Morning Glory" flowers are produced in myriads against attractive dark green foliage somewhat lighter in form and more graceful than the older type.	
IPOMOPSIS	
B., 4 ft.; sow autumn, spring; withstands heat well.	
I. elegans: Tubular flowers, 1½ in. long; borne loosely along stems; light scarlet, red, pink, yellow.	
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J. fruticans: E., 8 ft.; yellow spring flowers.	
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A. Sow spring.	
K. trichophylla: Is easily grown from seed; forming oval bushes 2 to 2½ ft. high, densely clothed with small, feathery, light green foliage, deepening in colour until the whole plant assumes a fiery crimson blue.	
K. scoparia: 3 ft.; not common; erect and pyramid-shaped.	

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L. Vossii: D., 12 ft.; finest of Laburnums.		LAUROCERASUS (Laurel)	
LACE FLOWER — See <i>Didiscus</i>		Fine E. trees; deep green foliage; splendid hedges; very suitable cool climates.	
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L. indica rubra: D., 12 ft.; rich red flowers.		LAVANDULA (Lavender) . . . 45, 89, 155	
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L. Edwardsii: E., 8 ft.; best variety; purple.		LEPTOSPERMUM (Tea Tree) . . 45, 89, 185	
L. grandiflora: E., 4 ft.; huge violet flowers.		Very hardy native E.; thrives in dry arid position; some in coastal sandy soil.	
		L. Keatleyi: E., 6 ft.; large pink flowers.	
		L. laevigatum: E., 25 ft. (Coastal Tea Tree); good hedges.	
		L. Sandersii: E., 6 ft.; winter flowers; pale pink and red centres.	
		L. scorparium grandiflorum roseum: E., 5 ft.; pink.	

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LEPTOSYNE (Winter-flowering Marguerite)	
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L. Stillmani: Bright golden.	
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P. and A.; 18 in.; sow autumn, spring, summer; winter and spring flowers; sow in beds and transplant or sow direct; long flowering period, through most of year; most soils are suitable.	
Annuals:	
L. maroccana: Good cut flowers, of violet and rose, in dense spikes.	
L. bipartita: Purple and white flowers. Fairy, Bouquet, Ruby King, Excelsior hybrids, in various colours.	
Perennial:	
L. cymbalaria: Trailing, with small mauve flowers; useful for rockeries; sow autumn.	
LINUM (Flax)	89
Sow autumn; desirable, ornamental, and free-flowering annual and perennial plants of great beauty in borders and rock gardens, the best-known being the annual varieties. All species are deserving of more attention.	



LOMBARDY POPLAR

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L. grandiflorum rubrum: A brilliant and attractive annual of long duration; sown in permanent location in autumn for early spring bloom, or in spring for summer blooming; flowers scarlet, abundantly produced; erect, branching; 2 ft.	
L.g. coccineum: Small scarlet flowers.	
L.g. rubrum: Red.	
L. perenne (Perennial Flax): Bright blue.	
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L. nodiflora (Frog Fruit): Forms a creeping carpet; useful as a substitute for grass lawns; smallish flowers; dry, sardy and hot exposed positions; cut only infrequently.	
L. citriodora (Lemon Scented Verbena; Aloysia): D.; soft-wooded shrub with heavily scented summer flowers; prune in winter to shape.	
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P. alpine plants forming a mat of blue and yellow flowers; hardy, for sun and shade; some are shrubs and need pruning after flowering; propagate by cutting.	
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A., 6 in.; easily grown; transplant into shade 9 in. apart; neat, compact trailing plants, useful for window boxes, borders and rockeries; if cut after the first flowering will flower again; several varieties. Sow autumn, spring.	
Crystal Palace: Deep blue flowers; bronze green leaves.	
Hybrida Pendula: Blue with white eye. Useful hanging baskets.	
L. cardinalis (Cardinal Flower): P., 4 ft.; rich deep soil, moist; sow seed autumn, spring, or divide the roots; red flowers in upright spikes.	
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L. japonica aureo-reticulata: E.; leaves 1½ in., veined with yellow; creamy flowers.	



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L. Caprifolium (English Woodbine): E., 6 ft.; can be trained by pruning into a bush.	
L. nitida: E., 3 ft.; small shining foliage; dense shrub; ideal dwarf hedges; fragrant summer flowers.	
LOOSESTRIPE (Creeping Jenny; Lysimachia)	
Hardy perennials for borders and beside pools and streams; divide and replant every 3-4 years; plant spring, autumn, 12-18 in. apart.	
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LOVE-LIES-BLEEDING — See <i>Amaranthus</i>	
LUCULIA	
L. gratissima: E., 8 ft.; magnificent winter flowers, perfumed and pink; frost tender; sheltered position.	
LUNARIA (Honesty)	
B., 18 in.; sow autumn, spring; easily grown, self-setting. The papery inner walls of the seed pods are useful for decoration.	
LUPIN	
A. and P.; 4 ft.; sow autumn, spring; sow direct because does not transplant well; hardy; leaves grey-green and divided; annual types up to 4 ft.	
Russel Type (Perennial): Recommended for cold climates; magnificent flowers of amazing size, closely arranged on thick stem; the colours include deep yellow, orange, red, blue and most brilliant bi-colours.	
Hartwegii Type: Attains a height of about 2 ft., its base branching, and carries numerous spikes studded with pea-shaped flowers; azure blue, rose, royal blue and white; also mixed.	
LYCHNIS	
P.; attractive border plants which produce masses of brilliantly coloured flowers.	
L. chalcidonica (Jerusalem Cross): Erect growing plant with large heads of bright scarlet flowers, produced through summer and autumn; very hardy; 3 ft.	
L. viscaria (Catch Fly): pretty dwarf tufts of prostrate foliage; spikes of dainty single bright rose flowers; 12 in.	

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Beautiful hardy flowering shrubs; deciduous types bloom in spring; evergreens bloom spring and summer, and are scented; thrive in cool moist soils.		Sow autumn and spring; easily grown in ordinary soil, succeeding even in half-shade; very decorative in beds or borders and fine for cutting.	
<i>M. denudata</i> : E., 30 ft.; shelter from wind; lime-free soil; pure white flowers.		<i>M. eximia</i> : Forms bushy garden plants bearing snow-white flowers in dense clusters, almost covering the oval plants with bloom; height, 8 in.; very desirable for bedding and fine for cutting.	
<i>M. grandiflora</i> : E., 20 ft.; huge white flowers, scented; large laurel foliage.		MATTHIOLA — See <i>Stocks</i>	
<i>M. Soulangiana</i> : D., 12 ft.; lime-free soil; large flowers.		MAURANDIA	161
<i>M. stellata</i> : D., 8 ft.; white flowers; protect wall.		Sow spring; superb climber; quick-growing, free-blooming; foliage is small but dense, and of a lively green; perennial, liking rich, friable soil; white and beautiful blue shades.	
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MALLOW (Malope)		MEDEOLA (Smilax)	
A., 3 ft.; sow spring, autumn; sow direct or transplant; thrive in most soils; large open flowers in white, rose, red; long period of bloom.		P.; sow spring.	
<i>M. trifida</i> : Rose and purple flowers, 2 in. across.		<i>Asparagoides</i> : Very handsome perennial trailing plant; the graceful beauty of its foliage renders it valuable for vases; small white flowers; attractive.	
<i>M.t. grandiflora</i> : Red flowers.		MELALEUCA	45, 185, 187, 213, 214
MALUS (Flowering Crab Apple)	45	Hardy E. trees and shrubs; suitable poor sandy soils and coastal sands; spring flowers.	
Small trees with ornamental fruits; D.		<i>M. lateritia</i> (Robin Redbreast Bush): E., 8 ft.; graceful; vermilion flowers in spikes 3 in. long.	
<i>M. floribunda</i> (Japanese Flowering Crab): Well-shaped, suitable lawns; red flowers, turning white; D., 20 ft.		<i>M. nesophila</i> (W. Aust. Tea Myrtle): E., 8 ft.; hardy; ornamental foliage and mauve brush flowers.	
<i>M. purpurea</i> Echtermeyer: D., 10 ft.; excellent, with pendulous branches. Rich red blossom.		<i>M. styphelioides</i> : E., 60 ft.; magnificent tree with spongy bark; prickly leaves; thrives in adverse conditions.	
<i>M. purpurea</i> Eleyi: D., 15 ft.; excellent; large ornamental fruit.			
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M. asperum : E., 4 ft.; neat shrub with purple flowers in autumn, winter.	M. tigrinus grandiflorus (Monkey Flower): Attractive large tubular flowers, beautifully shaped and blotched in several colours on yellow ground; suitable beds and edges; moist shady position.
MELIA (White Cedar) 184	MINA LOBATA (Quamoclit) 161
M. Azedarach (White Cedar): D., 20 ft.; ornamental foliage and lilac flowers; yellow berries; shade tree for hot dry districts; hardy.	P. grown as A.; sow spring and summer; sow direct, warm sunny position. A beautiful summer-flowering annual creeper; plants covered with orange-red and gold flowers during summer and autumn.
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M. criniflorum (Livingstone Daisy) Mixed: Annual; slightly spreading habit; covered liberally with flowers measuring about 1 in., comprising many delightful shades.	M. coccinea : E., 2 ft.; scarlet pendant flowers in summer, autumn.
M. crystallinum (Ice Plant): Perennial; peculiar glistening foliage, as if covered with ice; small white flowers.	MOCK ORANGE — See <i>Philadelphus</i>
M. tricolour : Perennial; crimson, white and purple; suits sandy soil well; a good rockery plant.	MONARCH OF THE VELDT — See <i>Venidium</i>
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A. , 12 in.; sow autumn, spring.	M. grandiflora : E., 10 ft.; rapid grower; clusters large white winter flowers.
Reseda odorata : Attractive little border annual which grows from 1 to 2 ft. high; a coarse, bushy plant with spikes of greenish-yellow flowers having delicious cool fragrance. The old-fashioned sweet-scented mignonette, which should be sown where they are to grow, as the plants do not transplant well; good for grouping, making a good border, and also cuts quite well. Other varieties.	MONTBRETIA (<i>Tritonia crocosmaeflora</i>) 123
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	M. riparium (Musk Flower): E., 6 ft.; masses feathery lavender-pink spring flowers; heavy pruning in spring; frost tender.
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	Mat-forming evergreen perennial, invaluable in hot, dry, sunny places as a ground cover on banks and elsewhere, as an edging, and in rock gardens and wall gardens; thrives in poorish, porous soil; white, soft pink, bright pink, lavender and pale blue flowers; plant spring or autumn, 12-15 in. apart.

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MYOSOTIS (<i>Forget-me-not</i>)	
A., 9 in.; sow autumn; sow direct or transplant; self-seeding; prefer position which has some shade, although they will grow in an exposed position if a good supply of water is kept going; a low-growing plant, often forming dense mats; hardy dark or light green lanceolate leaves; large racemes of small salver-shaped flowers, usually blue.	
M. <i>palustris</i> : Popular old-fashioned variety with blue flowers.	
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Attractive E., grown for foliage and berries; cool moist soil; best in mountains.	
M. <i>bullata</i> (N.Z. Native Myrtle): E., 10 ft.; reddish foliage; creamy flowers.	
M. <i>communis</i> (European Myrtle): E., 6 ft.; white flowers; berries black.	
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A.; sow autumn, spring, in warm climates; spring only in cold climates. An attractive sprawling bush which will grow in sun or part shade, covering 6 to 8 ft.; leaves round, attractive colour, pungent to taste; flowers 2½ in. in diameter, in single and double varieties; fragrant and lasting for a long time; particularly hardy, thriving in many soils and conditions; several varieties and colours.	
Dwarf Single (<i>Tom Thumb</i>): 12 in.	
Climbing Single: For trellises and fences; plant liberally.	
Semi-dwarf, Double and Semi-doubles: Golden Gleam, Scarlet Gleam. Flowers are large, exquisitely sweet-scented; plants are semi-tall, of strong, vigorous growth, and splendid for beds, broad borders, or may be used as ground covers; highly desirable for cutting.	
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A.; sow autumn; one of the finest hardy annuals; with the minimum amount of attention gives a most brilliant display; flowers of every shade are borne in profusion during the late winter and spring; particularly adapted for massing in small beds or bordering to paths, etc.	
N. <i>strumosa suttoni grandiflora</i> mixed: Large - growing, large - flowered types, in various colours.	
Dwarf Bedding Varieties:	
Blue Gem: Grows about 9 in. high, and forms perfect little bushes; blue flowers.	
Fire King: Compact growing variety which bears brilliant scarlet flowers.	
NEMOPHILA (<i>Blue Eyes</i>)	
A.; sow autumn, spring; dwarf plants; quick growing, early blooming, bearing a profusion of lovely cup-shaped sky-blue flowers with white centres; charming for edgings and rock gardens; grow in shade or semi-shade.	
N. <i>insignis</i> : Commonest; blue, white-eyed flowers.	
N. <i>Menziesii</i> : Straggling plant; light blue with dark-centred flowers.	

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P. ; well-drained soil and plenty of sunshine; greyish foliage; plant spring or autumn, 15-18 in. apart; divide and replant every 3-4 years; propagate by division at planting time or cuttings in summer.		N. <i>tomentosa</i> : Tall, tree-like; attractive leaves.	
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E. , hardy; 8 ft.; double and single flowers in trusses in summer, standing above foliage; useful hedges, windbreaks; moist soils and conditions.		N. <i>rivularis</i> : Creeping and rooting at the nodes to form a low matted shrub 9 in. high, with white cup-shaped flowers.	
N. <i>punctatum</i> : Single, pink.		N. <i>azurea</i> : E. , 3 ft.; blue flowers; plant when young and leave undisturbed.	
N. <i>splendens grandiflorum</i> : Double, deep rose pink.		NIGELLA (Love-in-a-mist)	
N. <i>splendens variegatum</i> : Foliage green and gold; flowers pink.		A. , 12 in.; sow autumn, spring; sow in permanent bed and thin out; useful for edgings; hardy; graceful foliage; flowers nearly hidden in light feathery leaves.	
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PAEONY	45	Early Giant (winter-blooming type):	
P.; magnificent herbaceous border plant for cool districts; deep rich soil, with abundant moisture during growth and flowering; protect from hot winds; blooms are very large, in many shades of colour. Tree types and herbaceous types; set herbaceous types up to 5 in. apart. Set crowns 3 in. below surface and do not disturb; provide ample organic matter and mulch in summer. Set tree types in similar fashion; these do not flower until after two seasons. Several species of each type.		Flower very quickly; if sown early, begin to bloom in early winter and continue to spring; very free flowering and if sown in beds or ribbon borders produce a fine display. Varieties:—	
PAINTED DAISY — See Annual Chrysanthemum		Blue Boy: Lavender.	
PALMS	172	Celestial Queen: Sky blue.	
PANDOREA	162, 163, 164	Charm of March: Velvet blue.	
PANSY (<i>Viola tricolor</i>)		Claret: Wine red.	
Thrives best in regions with cool summer nights, the best blooms being produced in cool weather; shade from the summer sun is desirable. Hardy perennials, best treated as annuals; ideal plants for bedding, borders and window boxes because of their long blooming period and because of the wide range of colours available. (<i>Violas cornuta</i>) have much the same requirements and colour range as pansies, but are harder and smaller-flowered and will flower further into the summer. <i>Violas</i> can also be used in rock gardens.		Helios: Pure yellow.	
Soil Requirements, Sowing, and Location: The ideal soil is a rich friable well-drained one high in organic matter. The pH should be between 5.5 and 6.0; that is, mildly acid. Lime should be applied sparingly, and then only when the soil is very sour. The soil is best prepared with liberal quantities of well-rotted animal manure and a sprinkling of superphosphate or bone dust. Nitrogenous manures should be used sparingly, if at all. For best results sow seed in January or February and transplant out seedlings early in March. In this way the plants become well established before the cold of winter. The seeds are best germinated in sandy loam, kept moist in a muslin-covered box.		Jupiter: Sky blue, purple blotches.	
Exhibition Types: The following strains give good results on the show bench or for garden display of high-class blooms:—		Winter Sun: Golden yellow.	
Englemann's Giants: A particularly fine strain producing splendid flowers of great size, handsomely blotched in a variety of colours.		Garden Type: When a very rich colour effect is desired, the following excellent strains will be highly pleasing:—	
Masterpiece Exhibition: Large undulated or curled blooms; fine rich colours.		Anderson's Large French Stained: A superb strain; grand shades of mahogany, crimson, yellow and blue; fine form, markings and substance.	
		Bugnot's Exhibition: A superb strain; flowers of fine substance, colourings and markings.	
		Roggli Type: This type embodies these outstanding features: Robust plant growth; long, strong flower stems; very large, well-formed flowers; well over-lapped petals; exceptional texture; good colours.	
		Lake of Thun (Ullswater Blue): Clear blue, dark purple blotch.	
		Rhinegold (Golden Blotched): Canary yellow, dark blotched.	
		Bedding Varieties:	
		Bismarck: Stout, fiery crimson flowers margined with gold, which remain in full beauty for a very long period; unusually compact habit.	
		Celestial Queen: Sky blue.	
		"Claremont" Blue: A deep bright blue, extremely vigorous and floriferous.	
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P.; coming more and more into favour for summer bedding; as easy to flower from a spring sowing as are antirrhinums, from which they make a pleasing change, while the plants continue in full bloom late into the autumn.		Many other varieties.	
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PELARGONIUM	45, 89, 164	P. campanularia (Gentian Blue): Dwarf, compact plants, bearing delightful blue flowers in generous profusion; excellent for edgings, massing or rockeries; easily grown.	
PERENNIAL ASTER (Michaelmas Daisy; Aster subcaeruleus)		P. Whitlavia: Commonest variety.	
Amongst the most important plants for the herbaceous border; the fine range of most beautiful shades of colour, together with the simplicity of their cultivation, gives them an unrivalled place in the autumn-flowering garden; invaluable for cutting for decorative purposes; do well in any ordinary garden soil, but should be divided every year into small clumps if the best results are desired.		PHASEOLUS	163
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PERNETTIA	89	P. mexicanus: 4 ft.; creamy summer flowers.	
PETUNIA	80	P. Virginalis: 4 ft.; large semi-double flowers.	
Sow spring and summer in cold districts; sow autumn and summer in warm districts. As this seed is very small it should be mixed with equal quantities of sand in order to ensure even distribution during the sowing process. Soil in the seed box should be freely watered and left to drain. The seed, with sand, is scattered and pressed firmly into the surface, then covered with only the lightest layer of fine sand or sandy soil. The best method of watering is to rest the seed pan in a shallow vessel containing water reaching about two-thirds of the way up the sides of the pan; leave until dampness appears on surface; repeat in time to prevent soil on top from becoming dry, as this drying will be fatal to the seedlings. Petunias thrive in our warm, sunny climate, and require a well-cultivated, fairly rich soil. After the plants have flowered in summer, cut them back lightly and they will respond with a second crop of flowers during the autumn.		PHLOX DRUMMONDII	89, 153
P. hybrida grandiflora superbissima: Beautiful blooms up to 6 in. across; wide open throats, deeply ruffled; very useful pot plants.		One of the most satisfactory annual bedding plants in commerce; its long flowering season, magnificent range of clear colours and wonderful adaptability are reasons for its great popularity. Sow seed in boxes or pans of sandy loam; keep the surface well moistened; when large enough to handle, prick out into prepared box, later transferring the plants to their permanent positions. Phlox is not particular as to soil — a well-worked soil with plenty of water is sufficient.	
Ruffled Californian Giants: Bloom early summer to late autumn; heavily ruffled; wide range of brilliant colours.		P. grandiflora: Large flowers, mixed or separate, in several colours.	
		P. nana compacta: Dwarf, compact; excellent for borders.	
		P. cuspidata: Distinct class, with long winged petals and often called "Star Phlox."	
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		P. glabra robusta: 15 ft.	
		P. glabra rubens: 8 ft.; white spring flowers; good hedges.	
		P. serrulata: 15 ft.; deep green serrated foliage; dense; white flowers in clusters; red berries; good hedges.	
		PHYSOSTEGIA (Gallipoli Heath)	
		P.; hardy; long spikes of bloom; tubular-shaped flowers, excellent for cutting; summer and autumn flowers.	
		P. alba: White.	
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<i>P. crassifolium</i> : 10 ft.; grey-green leaves; purple-brown flowers; useful dry situations.		PLUMS	219, 247
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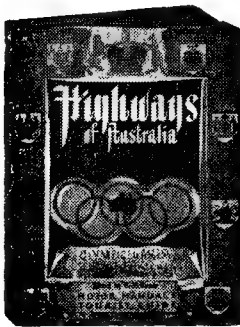
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PYRETHRUM

Showy and useful perennial, with feathery foliage and large single or semi-double flowers, produced on stems 18 in. to 2 ft. long. Amongst the most useful of all flowers for cutting, preferring a good rich loamy soil in an open situation, with plenty of moisture in summer. Sow autumn, spring.

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QUAMOCLIT — See <i>Mina Lobata</i>	
QUEENSLAND NUT — See <i>Macadamia</i>	
QUEENSLAND SILKY OAK — See <i>Grevillea robusta</i>	
QUERCUS (Oak)	184
Handsome symmetrical trees. D.; colourful autumn foliage.	
<i>Q. coccinea splendens</i> : D., 40 ft.; splendid colours; cool conditions of hills; splendens is best when grafted.	

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<i>Q. palustris</i> : D., 60 ft.; very satisfactory all purposes; thin, deeply cut leaves; grows fast when young.	
<i>Q. Robur</i> (English Oak): Stout spreading branches; more susceptible to diseases and pests.	
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RED HOT POKER — See <i>Kniphofia</i>	
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<i>R. succedanea</i> : D., 10 ft.; hardy ornamental with bright orange-red autumn foliage.	
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RIBES (Pink Flowering Currant)	45
<i>R. sanguineum</i> : D., 5 ft.; small pink flowers in drooping clusters over whole bush; showy; spring flowering; scented leaves.	



RETINOSPORA OBTUSA AUREA

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ROCK CRESS — See Aubrietia See Arabis	
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<i>R. amoena</i> : E., 8 ft.; compact; glossy foliage; clusters salmon-pink per- fumed flowers in spring; frost sensitive; prune after flowering.	
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<i>S. babylonica</i> (Weeping Willow): D., 30 ft.; vigorous, hardy tree; graceful weeping branches; thrives in moist positions	
<i>S. caprea</i> (Pussy Willow): D., 20 ft.; upright habit; silky catkins in spring before leaves unfurl.	
SALSIFY	269
SALPIGLOSSIS	
Sow autumn and spring; annual, richly coloured, veined and mottled blossoms; height 2 ft.; best sown	

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ROSE MOSS — See Portulaca	
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ROZELLA or ROSELLE	229
ROSMARINUS	45, 153
<i>R. officinalis</i> (Rosemary): E., 4 ft.; pretty small shrub; narrow rolled grey-green leaves; pale salvia- lavender flowers; suitable dwarf borders; easily grown.	
<i>R. prostratus</i> : E., 1 ft.; prostrate habit; suitable rockeries; frost tender.	
RUDBECKIA (Cone Flower)	
<i>P.</i> ; hardy, free-flowering and easily grown perennials, somewhat akin to the sunflowers in habit; ex- cellent and showy plants for sunny or partially shaded borders, and for yielding flowers for cutting.	
Kelvedon Star: Perfect cut flower; sturdy and free-flowering in beds; various forms and colours, all with dark central discs, surrounded by shining mahogany zones, on deep orange petals.	
RUELLIA	197
<i>R. macrantha</i> : E., 4 ft.; frost ten- der; large rose bell-shaped flowers, veined with purple; oval leaves 4 in. long; excellent pot plant; flowers all winter.	
<i>R. australis</i> : E., native; blue flowers.	
<i>R. amoena</i> : E.; long narrow leaves; very effective red flowers in loose clusters.	
RUPTURE WORT — See Herniaria	
RUSSELIA	
<i>R. juncea</i> : E., 4 ft.; rush-like, pen- dulous branches; bright scarlet tubular flowers all year.	

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where the plants are to grow. They like fairly open, sandy soil, and must be watered freely.	
<i>S. grandiflora superbissima</i> (Mixed): Fine range of colours, including red, violet, blue, yellow, etc.	
SALVIA	89
Perennial; generally treated as an an- nual; desires a sunny position; has square stems, dark green leaves and a bushy habit; splendid for bedding or massing; hardy, erect, growing from compact bush, with divided leaves; good for cutting.	

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- S. splendens* (Bonfire Salvia): Biennial; dwarf and bushy; covered with erect spikes of scarlet flowers.
- S. farinacea*: Biennial; suitable for bedding; sky blue; height 2 ft.
- SAMBUCUS** 45, 205
- S. nigra aurea* (Golden Elderberry): D., 12 ft.; large bushy shrub; bright golden leaves; best colours in cool conditions.
- SAND VERBENA** (*Abronia umbellato*)
- A., 9 in.; sow autumn, spring; trailing plants; for beds, borders, rockeries and flower boxes; pink fragrant flowers; sunny location and light soil.
- SANDWORT** — See *Arenaria*
- SAPIUM**
- S. sebiferum* (Chinese Tallow Tree): D., 20 ft.; symmetrical; excellent plum-coloured autumn leaves; splendid specimen tree.
- SAAPONARIA** (Soap Wort; Cow Herb)
- A., 18 in.; sow spring to autumn; easily grown in ordinary soil in sunny position; good cut flower; useful in rockeries and under taller trees.
- S. Vaccaria alba*: Pure white.
- S. Vaccaria rosea*: Large rich satiny pink blooms.
- S. calabrica*: Dwarf, with pink flowers. Some species are perennials.
- SAXIFRAGA** (Saxifrage) 153
- Rockery plants of various forms; all have attractive flowers and foliage; low habit, in semi-shade.
- S. umbrosa* (London Pride): Several varieties in white, pink and red.
- Kabischia* varieties and species can be grown in full sun in loose humus soil.
- S. Megasea* (Elephant's Ear): (*S. cordifolia*): Dwarf, thick-leaved with waxy pink winter flowers; moist soil in sun and semi-shade. Two derived species have white and purple flowers.
- SCABIOSA** (Pincushion) 89
- A., P.; 18 in.; sow autumn, spring. Easily cultured in ordinary soil, in sunny position; prefers limed soil; blooms profusely; excellent cut flowers. There are annual and perennial types.
- S. atropurpurea*: White, pink, purple, red.
- Annuals: Azure Fairy, blue; Cherry Red, red; Loveliness, salmon. Dwarf and tall doubles.
- Perennials: Caucasias, lilac, white, blue.

- SCHINUS** 185, 187
- S. molle*: E., 30 ft.; rapid grower; weeping branches, graceful foliage; useful shelter in warm inland; thrives in all but coolest climates.
- SCHIZANTHUS** (Butterfly Flower) . . 177
- A., 3 ft.; sow autumn, spring; hardy, but requiring sheltered position; transplant; handsome foliage. Excellent for bedding in warm protected areas, also growing as a pot plant. Thousands of butterfly-like blooms, heavily veined and coloured, resembling miniature orchids, from whence its nickname is derived. Attractive pot plant and good for cut flowers; appearance of flowers is crab-like. Likes a moist situation; an excellent plant for general show and for cutting. Frequently pinch back the plant in younger stages.
- S. wisetonensis* hybrids: Large blooms, prettily marked and blotched; 1½ ft.
- Several hybrid varieties and strains.
- SCHIZOCENTRON** 153
- SCILLA** 125
- SEA HOLLY** — See *Eryngium*
- SEA LAVENDER** (*Statice latifolia*)
- Has broad basal leaves and wiry, much-branched stems that carry tiny lavender or white flowers in immense heads. They like sandy soils.
- SEA PINK** (Sea Thrift)
- Easily grown in open warm situations in drained soil; several species of genus *statice*. Useful in beds and borders. The seeds are actually dried flower heads. Decorative whether as cut or dried flowers.
- SEA THRIFT** — See *Sea Pink*
- SEDUM** (Stonecrop) 153
- SEED BOXES** 53, 74, 90
- SEED SOWING** 73
- SEMPERVIVUM** (House Leek) 153
- SENECIO**
- S. Petasites*: E., 6 ft.; hardy; large foliage; yellow spring flowers.
- SENNA BUSH** — See *Cassia*
- SEBANIA** 45
- P., 8 ft.; sow spring.
- S. tripetii* (Brazilian Glory Pea): Free-flowering with very showy orange-coloured flowers in bunches. Best in frost-free areas.

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SHASTA DAISY (<i>Chrysanthemum leucanthemum</i>)		SOLLYA	164, 214
Hardy; white-flowered perennial of easy culture in fairly light, well-drained soils, but tending to die in cold, heavy, wet ones. Many varieties, with single, semi-double and fully double flowers; bloom in summer. Plant in deep, rich soil in full sun in spring or early autumn, 1½-2 ft. apart; divide and replant every other year; propagate by division.		SOPHORA	45, 89, 201
SHIRLEY POPPY (Corn Poppy) (<i>Papaver rhoeas</i>)		S. tetraptera (N.Z. Kowhai; N.Z. Laburnum); D., 10 ft.; upright and graceful; fern-like foliage; racemes of golden yellow spring flowers; well-drained sandy loam; fairly successful in dry places.	
A.; sow autumn, spring; plants will grow in sunny and open places, preferring warm soil. These are hardy, erect, with green, hairy, finely-divided leaves. The flowers of most poppies are brilliant colours, though usually short-lived.		SOWING CHART — FLOWERS	91
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SILENE (Catchfly)	153	(See also <i>Cytisus</i> ; <i>Genista</i>)	
Maritima and its double-flowered variety are white prostrate perennials, well suited for sunny rock gardens, dry walls and between flagstones. Schafta (6 in., pink) is for similar locations. Acaulis (2-3 in., pink) is a gem for rock gardens. Alpestris, quadrifida: Easy white-flowered rock garden kinds.		S. junceum: E., 8 ft.; hardy bushy shrub; rush-like branches; profuse yellow scented pea-like blooms in spring; prune after flowering; well in poor soils and dry conditions.	
SILKY OAK — See <i>Grevillea robusta</i>		SPEEDWELL (<i>Veronica</i>)	201, 205
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SNEEZEWEED — See <i>Helenium</i>		Spring flowering hardy shrubs.	
SNOWBALL TREE — See <i>Viburnum</i>		S. Bumalda Anthony-Waterer: D., 3 ft.; variegated green-cream foliage, crimson flowers.	
SNOWDROP (<i>Galanthus nivalis</i>)	124	S. Reevesiana: D., 6 ft.; pretty double white flowers; bushy and spreading.	
SNOW-IN-SUMMER (<i>Cerastium tomentosum</i>)		S. prunifolia flore pleno: Beautiful early flowering; pure double white flowers; lovely autumn colours; 4 ft.	
Hardy spreading perennial with greyish foliage; in late spring it becomes a mass of pure white blooms. For rock gardens, dry walls and borders; full sun; plant spring or autumn, 12-15 in. apart; prune lightly after blooming.		SQUASHES	269
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SOLANDRA	89, 163	STATICE (Sea Lavender)	155
SOLIDAGO — See <i>Golden Rod</i>		(See <i>Sea Pink</i>)	
		Best in thoroughly drained, fertile soils and warm, sunny locations; sow outdoors when the trees are leafing in rows 12-15 in. apart for cutting, or broadcast in borders. Thin 6-9 in. apart. The "seeds," as bought, are really clusters of dried flowers, each containing several seeds. Pull them apart as much as possible before sowing. Kinds:—	
		Sinnatum: 2-2½ ft.; white, pink, blue or mauve.	
		Bonduelli: 2-2½ ft.; yellow.	
		Suworowi: Lavender-rose.	
		STERNBERGIA	117
		STENOCARPUS	45, 187
		S. sinuatus (Queensland Fire Wheel Tree): E., 25 ft.; upright growing; bold, glossy green foliage; unusual wheel-shaped vivid crimson flowers.	
		STEPHANANDRA	202
		STEPHANOTIS	89
		STERCULIA	185, 187
		(See <i>Brachychiton</i>)	

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STOCKS (Matthiola) (See also Virginia Stock)

Sow mid-summer to late autumn; in cold districts sow also in early spring. Sow in seed boxes, covering the seed with just a fine layer of soil. Seedlings should be pricked out as soon as they are large enough to handle and, later on, placed in permanent positions. They like a sunny situation. Stocks are most impatient of cold, wet, undrained soil. Deeply cultivated sandy loam, not over-manured, but with a quantity of lime worked through, produces the best effect. Over-watering is the cause of many failures.

Many varieties:—

Early Giant Imperial: Large individual florets, up to 2 in. diameter nicely balanced on long flower stalks. The plants grow 24 to 30 in. in height, bloom early.

Early Giant Nice: Useful in all circumstances; free-flowering habit, delicious perfume and a large proportion of double flowers make it most popular. Best treated as an annual. Height, 2 to 2½ ft.

Giant Perfection: Up to 30 in. and very branched; early blooming; favoured.

Super Giant Imperial: An improved type of the Early Giant Imperial group. Fully base-branching plants produce 12 to 15 huge flower-spikes. Large double individual flowers from 1½ to 2 in. in diameter. In full bloom, each spike has 40 to 50 flowers open at once.

Brompton (Purple Stock): Many inland gardeners prefer this biennial group. Plants withstand winters well and bloom very early in spring; display extending over a long period. Height about 2 ft.

STOKES ASTER (Stokesia)

P.; summer blooming; height 1-1½ ft. Like annual asters, blue, white or yellowish; for beds, borders and cut flowers; thrives best in sandy, fertile soil in full sun. Fails in earth cold, wet or clayey. Plant in spring or autumn, 8-10 in. apart.

STONE FRUIT 218

STRAWBERRIES 223, 224

STRAWBERRY TREE — See *Arbutus*

STREPTOCARPUS (Cape Primrose)

P. Small useful plants for cool bush houses, glass houses and sheltered positions; similar in appearance to gloxinias, but longer tubed. Sow by seed. Several species and varieties.

STURT'S DESERT PEA — See *Chianthus*



STENOCARPUS SINUATUS

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ST. JOHN'S BREAD — See *Cerantonia*

ST. JOHN'S WORT — See *Hypericum*

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SUMMER CYPRESS — See *Kochia*

SUNFLOWER — See *Helianthus*

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SWAINSONIA 45

SWEET ALICE — See *Alyssum*

SWEET BERGAMOT

Monarda didyma: **P.**; borders in cool climates; fragrant leaves and scarlet flowers in summer; semi-shade; propagate by division in autumn, spring.

SWEET PEA (*Lathyrus odoratus*) . . 161

A sunny situation is quite necessary if the flowers are required in the winter months, and perfect drainage is essential—a water-logged position turns the foliage yellow. According to climate, the seed can be sown from December to July; sow early for winter blooms. Sow seed about ½ in. deep, and do not over-water, as the seeds may decay. In heavy or clayey soil, covering the seed with sand ensures better germination; sow 4 in. apart and stake the young plants.

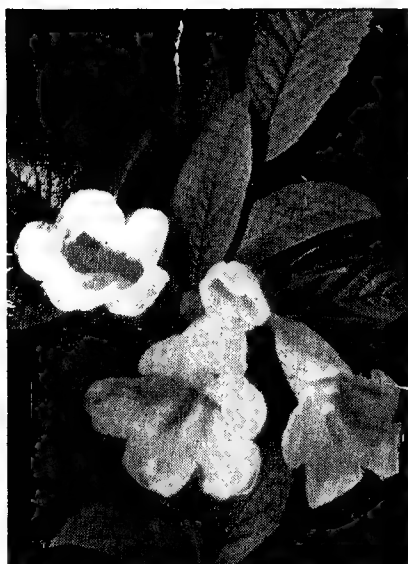
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SWEET POTATOES	269	larger heads; very useful for massed effect; useful cut flowers.	
SWEET SULTAN — See <i>Centaurea</i>		SYMPHORICARPUS	45
SWEET VALERIAN (<i>Centranthus</i>)		<i>S. racemosus</i> (Snowberry): D., 4 ft.; small flowers; attractive large white berries.	
P.; very hardy; for borders; allow space to extend itself. <i>C. rubra</i> is commonest.		<i>S. vulgaris</i> (Coral Berry): Small coral-coloured berries in dense heads.	
SWEET WILLIAM — See <i>Dianthus barbatus</i>		<i>S. vulgaris variegatum</i> : Bright green and yellow foliage.	
SWEET WIVELSFIELD		SYNCARPIA,	
B. grown as A.; 12 in.; sow late summer, autumn; transplant to open or semi-shade; favoured in warm climates. <i>Dianthus</i> hybrids, similar to Sweet William, with		<i>S. laurifolia</i> (Turpentine Tree): E., 40 ft.; fine upright habit; ornamental foliage; useful parks or large lawns.	
		SYRINGA	89, 196

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TAGETES — See African, French, Dwarf, Giant Tree Marigolds		T. oreoides (Victorian Waratah): E., 15 ft.; showy flowers.	
TALLOW TREE — See <i>Sapium</i>		T. speciosissima (N.S.W. Waratah): 6 to 9 ft.; serrated foliage; handsome flowers in spring.	
TAMARIX (Flowering Cypress) 45, 185, 196		TEUCRIUM (Germander)	155
Hardy shrubs and trees; plume-like panicles of flowers in spring, summer; suitable poor sandy soil and by sea; prune to shape in winter. All D., except <i>T. aphylla</i> .		THALICTRUM	
T. aestivalis (pentandra): Upright, rich carmine summer flowers; 10 ft.		Sow autumn and spring; magnificent herbaceous perennials; one of the grandest subjects for house and garden decoration. They die down in winter and reappear each spring: flower stems 3 ft. long, are light and graceful, crowned with showers of delicate flowers with yellow anthers; flower profusely over a long period.	
T. aphylla (articulata) (Evergreen Tamarix; Athel Tree): E.; vigorous; foliage silver-grey; pink flowers; excellent shelter in warm areas if watered; not recommended south of Divide.		T. adiantifolium: Foliage like maiden hair fern; cream-yellow flowers.	
T. japonica (juniperina plumosa): 15 ft.		T. diptercarpum (Lavender Shower): Dainty lavender-violet flowers.	
T. tetrandra purpurea: 8 ft.; rosy flowers in spring.		THICROMYRTUS CILIATUS	209
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TASSEL FLOWER — See <i>Calliandra</i>		THUJOPSIS	190
TEA TREE — See <i>Leptospermum</i>		THUNBERGIA	163
TECOMA	89, 196	Sow spring; half-hardy climbing annual; grows rapidly; height, 36 in.	
Valuable ornamentals; bell-shaped flowers in summer; prune regularly.		T. gibsoni: Rich orange self, large flowers; excellent; tender climber.	
T. capensis: E., 10 ft.; dense; orange-red flowers; beautiful floral hedge.		THUJA OCCIDENTALIS	155, 189
T. Smithii: D., 10 ft.; bushy; orange-yellow flowers.		TIGER FLOWER	125
TELOPEA (Waratah)		TIGRIDIA PAVONIA (Tiger Flower or Jeckey's Cap)	125
Well-known showy native plants and trees; handsome crimson flowers; loose well-drained soil; do not over-cultivate.		TILIA	184
		THYMUS (Thyme)	153
		TIBOUCHINA	89

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TECOMA VELUTINA

TITHONIA (Mexican Sunflower)

Sow spring, summer. Spreading erect perennial plant with velvety leaves wavy, sometimes lobed; vivid orange-scarlet or tangerine flowers, 3 in. across, like a huge Zinnia or Marigold. Densely branching plants with dark green wrinkled dissected leaves, with corymbose centres of medium-sized single flowers.

S. speciosa (Fireball; Mexican Sunflower): Brilliant orange-scarlet single dahlia-like flowers; good cut flowers and tall backgrounds; up to 6 ft.; allow plenty of room.

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ULMUS (Elm) 184

Large ornamentals; D.; plant in winter only; thrive most temperate zones.

U. chinensis (parviflora) (Chinese Elm): Small evergreen; attractive serrated leaves.

U. glabra vegeta (Huntingdon Elm): Tall; rough bark; smooth and glabrous leaves.

U. pumila (Siberian Elm): Small tree; graceful; survives dry conditions.

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TOAD FLAX — See Linaria

TOBACCO PLANT — See Nicotiana

TOMATOES 270

TOP DRESSING 72

TORCH LILY — See Kniphofia

TORENIA

A., 12 in.; spreading habit; flowers of blue and violet, with yellow markings of tubular shape; useful for edges in place of pansies in warm areas; in frost areas raise in hot frames; transplant when sturdy.

TOXICOPHLAEA

T. spectabilis: E., 6 ft.; sweet-scented white flowers; conspicuous bronze-red foliage.

TRACHELOSPERMUM 89

TREASURE FLOWER — See Gazania

TREE MARIGOLD — See French Marigold

TREES 178

TREE TOMATOES — See Cythomandra

TRENCHING 57

TRISTANIA

T. conferta: E., 40 ft.; one of finest evergreens; spreading growth; unrivalled for shade in dry areas; drought-resistant; handsome shining pointed leaves.

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TURPENTINE TREE — See Syncarpia

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UMBRELLA TREE — See Brassia

URSINIA (Jewel of the Veldt)

Sow early spring; easily raised from seed in sunny position; brilliant daisy blooms, 2 in. across, freely borne on long wiry stems in summer; good for edges and cut flowers.

U. anethoides: Dwarf, with orange flowers with dark centres on long stems.

UVALARIA — See Bellwort

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VEGETABLE GROWING	260	V. Carlesii : D., 4 ft.; one of loveliest shrubs; clusters snow-white flowers with wonderful perfume; cool districts; in warm areas if sheltered.	
VENIDIUM (Monarch of the Veldt)		V. Opulus sterile (Snowball Tree; Guelder Rose) : D.; snowball-like flowers in spring.	
A.; sow autumn; brilliant plants; large daisy flowers, 4 in. across; do best in well-drained soil and full sun; excellent cut flowers; 3 ft.		V. tomentosum sterile (plicatum) : D., 6 ft.; sterile; non-berrying; magnificent flowering; leaves deeply furrowed; thrives in cool districts.	
V. fastuosum : A.; vivid orange with dark centre.		VINCA (Periwinkle)	153
V. fastuosum hybrids : Flowers 5 in. across; many colours; each petal blotched at the base.		VIOLA (Viola Cornuta)	89
VERBASCUM — See Mullein		Sow Jan., Feb.; plant out in March. One of most dependable winter bedding plants; rear as for pansies; flowers smaller than pansies and standing above the foliage.	
VERBENA (Vervain)	89, 153	Apricot: Apricot yellow and orange.	
A., 1 ft.; sow autumn, spring; transplant to open position when hardy. Hardy and sturdy; abundance of bright blooms for many months; ideal edgings, ground cover, rockeries, porch boxes, etc.; thrive in poor soil and stand drought well. Do not plant in freshly-manured soil. Several hybrids in many colours.		Blue Gem: Deep violet blue.	
VERONICA (Speedwell)		V. lutea: Yellow.	
. 89, 153, 201, 205, 207		Mauve Queen: Mauve.	
P., E., hardy; 2-4 ft.; profuse winter, spring flowers; rapid growers in any soils and conditions; very suitable seaside.		VIOLA HEDERACEA	211
For rock gardens, borders, etc.; easily propagated by seeds in spring, division in spring or autumn, and by cuttings. Plant in spring or autumn, 6-12 in. apart.		VIOLET (Viola odorata)	
V. Andersoni variegated: 3 ft.; flowers blue; foliage heavily margined with white.		P.; hardy; suited for sunny positions; sow seed in autumn; plant out seedlings in May to July in broken down soil containing organic matter and fertiliser; space a foot apart; water and cultivate regularly; lift and divide every two years, using the rooted runners. Many excellent varieties available.	
V. cupressoides : 2 ft.; cypress-like foliage; violet flowers; shapely bush.		VIRGILIA	45
V. Hartiana : 9 in.; trailing habit; bright green foliage; attractive mauve spring flowers.		V. capensis: E., 25 ft.; attractive foliage; pea-shaped flowers of rose and white in spring, summer; very fast growing; hardy.	
V. Hulkeana (N.Z. Lilac) : Pale lilac flowers in spikes in spring; good for cutting.		VIRGINIAN STOCK (French Forget-me-not; Malcomia)	
V. imperialis variegata: Attractive dwarf; variegated; in summer green and white; in winter pink.		Sow autumn. Delightful border plants which produce fragrant flowers of beautiful colours; admirable bedding or rockery plants, growing about 6 in. high; sow the seed where required to grow, as they do not transplant well; use a double row for edgings.	
V. parviflora : Fine foliage; pale pink flowers; compact hedge.		VISCARIA (Catchfly; German Catchfly)	
VERVAIN — See Verbena		Sow autumn and spring. An extremely hardy border or bedding plant which resembles Phlox Drummondii in habit; splendid for an exposed position; also for rockeries; flowers for many weeks; best sown in boxes and transplanted when large enough to handle.	
VIBURNUM 45, 89, 196, 201, 202, 207, 253		V. oculata (Mixed): Many shades of pink, red, rose and blue, also white.	
Evergreens and deciduous; hardy, free-flowering; grown for flowers; thrive in all conditions.		VITEX	
V. Burkwoodi : E., 4 ft.; excellent shrub; white scented flowers; shiny green leaves.		V. Agnus-castus (The Chaste Tree): D., 5 ft.; grey foliage; large panicles blue flowers in autumn, summer.	
V. dilatatum : D., 6 ft.; wrinkled foliage; large creamy flowers; bright red berries.		VITIS	162

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WEIGELIA (<i>Diervilla</i>)	45, 89, 196, 205
Beautiful <i>D.</i> shrubs; thrive every- where; abundant trumpet-shaped flowers in spring; prune after flowering.	

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<i>W. amabilis variegata</i> : 3 ft.; pink flowers; foliage with white edges.	
<i>W. Eva Rathke</i> : 5 ft.; rich rose flowers.	
<i>W. Abel Carriere</i> : 6 ft.; light red.	
<i>W. styracina</i> : 4-8 ft.; deep pink.	
WELSH POPPY — See <i>Meconopsis</i>	
WEST. AUST. LACE FLOWER — See <i>Didiscus</i>	
WESTRINGIA	
<i>W. rosmarinifolia</i> : E., 4 ft.; hardy, densely growing; grey-green foli- age, white flowers; good seashores; good dense hedges.	
WHITE CEDAR — See <i>Melia</i>	
WILLOW — See <i>Salix</i>	
WINTER FLOWERING MARGUERITE — See <i>Leptosyne</i>	
WINTER MARGOLD — See <i>Calendula</i>	
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ZINNIA	

A. The value of zinnias as garden and cut flowers cannot be stressed too highly for ease of culture and long blooming season, together with their wide range of colour and varied flower forms. Zinnias are heavy feeders and, while they grow in poor soil and under unfavourable conditions, they must have rich, well-fertilised soil and be watered freely during periods of dry weather if the finest flowers are wanted. Plant in full sun; they will not do well in the shade or near trees. Zinnias are hot weather flowers, coming into their full beauty in mid-summer and continuing through to late autumn. Flowers last for days when cut; different size flowers and colours for every purpose. After the soil has become thoroughly warm, sow seed in the open ground where plants are to bloom. Thin out large-flowered varieties to stand 2 ft. apart, smaller-flowered types 1 ft. Zinnias will bloom in about two months. All the different classes of zinnias are easy to grow.

Giant Double-flowered Zinnias: Giants which greatly resemble Giant Dahlias. Individual blooms measure up to 5 in. across; well-branched, sturdy plants, 3 ft. tall. Bright and showy in the garden, wonderful for cutting as flowers; last a long time.

Giant Californian Zinnias: Immense double flowers, 5 to 6 in. across, about 3 ft. tall; produce many long, strong flower stems; ideal for cutting; attractive in beds and borders.

Lilliput, Baby or Pompon Zinnias:: Plants are dwarf, bushy and very branching; 12 to 18 in. tall, and literally covered with double blooms 1 to 1½ in. across. Nice as edgings to other plants or caller-growing zinnias.

Scabiosa-Flowered Zinnias: Differs from other zinnias in the formation of the flowers, which resemble those of the double crested cosmos. Flowers 2½ to 3 in. across, similar in form to the flowers of the annual scabiosa; fine border plants; nice for cutting.

Mexican or Miniature Zinnias (*Zinnia Haageana*): Distinct type, producing dwarf well-branched plants 1 to 1½ ft. tall. Unexcelled for bedding, edgings, and wonderful showy material for cutting.

Zinnia linearis: Dwarf, with single orange and yellow striped petals. The plants commence to flower when 6 in. tall and keep on right through the season until the late frosts of autumn; excellent for window boxes or in any part of the garden where a dwarf growing plant with brilliant colouring is desired.

ZONES	5
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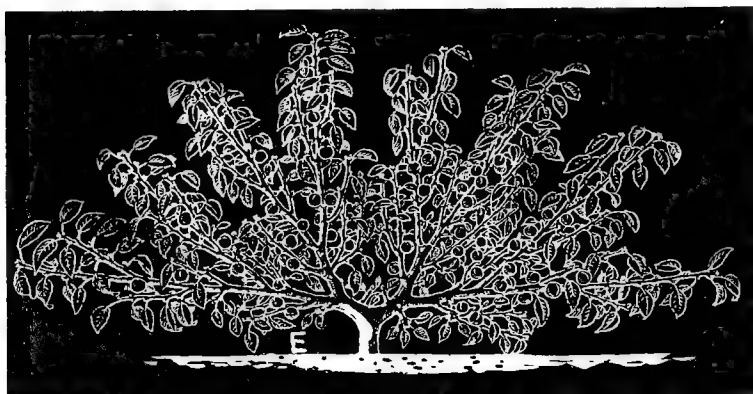
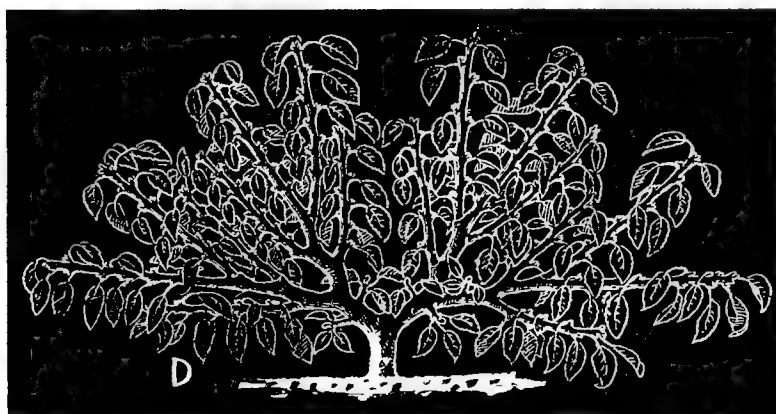
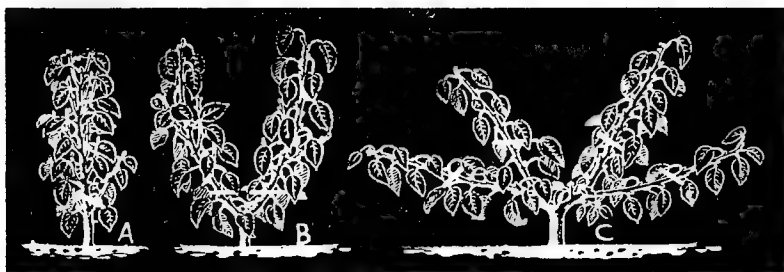


Illustration A shows an upright shoot which should have its roots severed with a spade about 12 in. from the stem in autumn to assist late growth and the ripening of the wood. Cut it to within 10 in. of the ground to encourage spring shoots of equal strength as B. C shows position for third pruning (with white bars) so as to produce other branches. D is the result of three prunings. E — Apricot after its fourth year of pruning.

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Salpiglossis



Statice



Ageratum



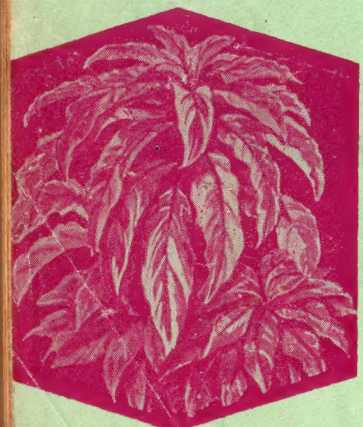
Escallonia Macrantha



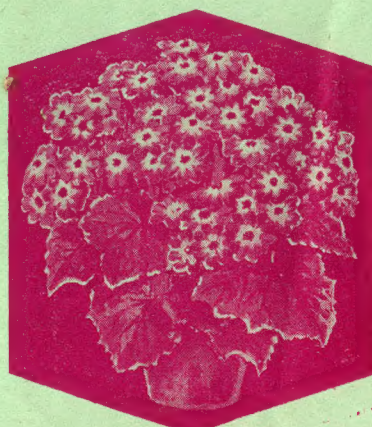
Pyracantha (Evergreen Hawthorn)



Celosia (



Amaranthus (Jacob's Coat)



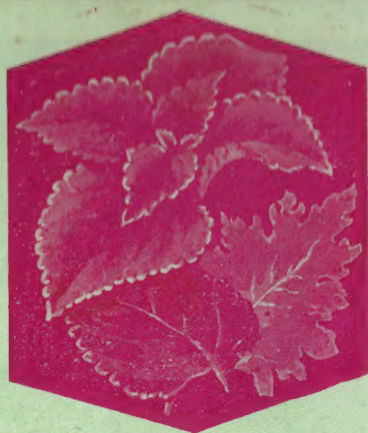
Cineraria



Godetia



Blue



Coleus



Calliopsis



omb)



Blue Clerodendron Ugandense



Solanum, Wendlandii



Balsam Camellia-flowered



Candytuft Umbellata

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